UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D. C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

May 30, 2002

MEMORANDUM

SUBJECT: **Carbaryl.** List A Reregistration Case 0080. Chemical No. 056801. Revised Product and Residue Chemistry Chapters for the Reregistration Eligibility Decision. DP Barcode: D283328.

FROM: Felecia Fort, Chemist
Reregistration Branch 1
Health Effects Division (7509C)

THRU: Whang Phang, Ph.D., Branch Senior Scientist
Reregistration Branch 1
Health Effects Division (7509C)

TO: Jeff Dawson, Chemist
Health Effects Division(7509C)
and
Anthony Britten, Chemical Review Manager
Special Review and Reregistration Division (7508C)

Attached are the Revised Product and Residue Chemistry Chapters for the Carbaryl Reregistration Eligibility Decision Document (RED). The chapters were revised to incorporate comments submitted by the registrant. These revisions include changes to the requirements for label amendments, changes to label acceptance dates, and changes to the food/feed use patterns table. The chapters were also changed to reflect uses that are not being supported by the registrant or have been cancelled.

Product Chemistry

Most pertinent data requirements are satisfied for the Aventis 99% T, except that data are required for UV/visible absorption (OPPTS 830.7050). For the Aventis 97.5% and 80% FIs, and the Drexel 50% FI, additional data are required concerning product identity and composition, discussion of formation of impurities, certified limits, enforcement analytical method, oxidation/reduction, explodability, storage stability, corrosion characteristics, and density (OPPTS 830.1550, 1670, 1750, 1800, 6314, 6316, 6317, 6320, and 7000). Data requirements for the Drexel and Platte 99% Ts, and AgrEvo 97.5% FI, which are repackaged from EPA-registered products, will be satisfied by data for the source products. All product-specific product chemistry data are required for the Sureco 80% FI, Amvac 46% FI, and AgrEvo 1% FI. Provided that the registrants submit the data required in the attached data summary tables for the carbaryl MPs, and

either certify that the suppliers of beginning materials and the manufacturing processes for the carbaryl MPs have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, HED has no objections to the reregistration of carbaryl with respect to product chemistry data requirements.

Residue Chemistry

The residue chemistry database is essentially complete. The reregistration requirements for plant and livestock metabolism are fulfilled. Acceptable metabolism studies depicting the qualitative nature of the residues in lettuce, radish, soybean, ruminants and poultry have been submitted and evaluated. In addition, adequate magnitude of the residue data are available on the following crops: alfalfa, almond, asparagus, beans (dried and succulent), blueberry, broccoli, cabbage, celery, cherry, citrus fruits, clover, corn (sweet and field), cucurbits (cantaloupes, cucumbers and squash), cranberry, flax, grape, head and leaf lettuce, mustard greens, okra, peanut, peas (dried and succulent), pecan, pepper, pistachio, pome fruits, potato, prickly pear cactus, raspberry, rice, sorghum, soybean, spinach, stone fruits, strawberry, sunflower, sweet potato, tobacco, tomato, and walnut.

The following data gaps remain outstanding.

- A review of the labels and supporting residue data indicate that several label amendments are required. Details are provided in the attached chapter.

- The requirement for acceptable enforcement methods which determine residues of concern in plant and livestock commodities remains outstanding.

- The requirements for storage stability data are not satisfied for purposes of reregistration. Additional data are required depicting the storage stability of carbaryl *per se* in an oilseed, processed commodities of an oily crop, and a dried fruit stored for up to 10 months.

  In addition, the registrant is relying on earlier magnitude of the residue studies that are not supported by the existing storage stability data; therefore, additional storage stability data are required. The required data must reflect storage intervals of 18 months for alfalfa commodities, 15 months for potatoes, 22 months for wheat commodities, and 33 months for rangeland grass. In addition, if the registrant wishes to rely on the previously submitted sugar beet processing study, information pertaining to sample conditions and intervals for the study must be submitted.

- For the purpose of reregistration, the requirements for storage stability data for carbaryl residues in livestock commodities are partially satisfied. Additional information on the storage intervals prior to analysis for metabolite residues in the cattle feeding study is required.

- Separate tolerances on many commodities need to be reassigned concomitant with establishing tolerances for the appropriate crop group and subgroup. The recommended changes are summarized in Table C under "Tolerances Needed Under 40 CFR §180.169(a), crop group/subgroup tolerances."

- The data submitted are not adequate to support the use of granular (G) formulations of carbaryl on leafy vegetables. Residues of carbaryl found in leaf lettuce were not consistent. Both samples of lettuce from the 10% G treatment had substantially higher residues (37.01 and 47.22 ppm) than one of the samples treated with the FlC (23.25 ppm). Additionally, all residues were significantly above the current tolerance of 10 ppm.and all residue data submitted in support of the tolerance in lettuce (<8.85 ppm). No explanation for the higher residues was given by the registrant. The registrant may elect to repeat the side by side trial on leaf lettuce again or submit a rationale for the results of the leaf lettuce study.

- Data are required depicting residues of carbaryl in/on grass forage harvested immediately (0-day) following the last of two applications of carbaryl (WP or FlC) at 1.5 lb ai/A to pasture. A total of 12 field trials are required in areas throughout the U.S.

- Adequate data are available to reassess the tolerances for residues of carbaryl in/on dried beans, cowpeas, lentils and peas with pods. These data support the establishment of crop subgroup tolerances for edible-podded legume vegetables (6A), and for dried, shelled pea and bean except soybean (6C). However, additional residue data are required if the registrant seeks tolerances for residues in/on succulent, shelled pea and bean commodities. A total of 12 tests, six tests each on a succulent, shelled cultivar of bean and garden pea, are required to support a tolerance for residues in/on the succulent, shelled pea and bean crop subgroup (6B). The registrant is referred to OPPTS GLN 860.1500 for the number and distribution of tests required.

- Adequate data are available to reassess the tolerance for wheat forage and straw. However, the Agency now considers wheat hay a significant RAC for feed purposes (OPPTS GLN 860.1000 Table 1.). A full set of 20 field trials as specified in OPPTS GLN 860.1500 are required depicting carbaryl residues in/on wheat hay. When all the field trials are complete, PHIs and tolerances for hay based on the field trial data should be proposed. Data on wheat hay will be translatable to proso millet hay.

- The registrant intends to support a tolerance for residues of carbaryl in/on imported pineapples (Aventis personal communication with C. Olinger, 9/24/98 SMART meeting). Residue data are required depicting residues in/on pineapples following application of carbaryl at the maximum use rate and minimum PHI. Five trials must be submitted, three from Costa Rica and two from Mexico.

- The registrant does not intend to support carbaryl uses on avocados, barley, maple sap, oats, rye, and sweet sorghum; however, IR-4 has indicated (Correspondence from K. Dorschner, IR-4 Project, 9/15/94) that they may fulfill the residue data requirements for some of these commodities. These data have not been submitted.

cc: List B Rereg. File
RDI: WPhang 11/7/00, WJHazel 10/7 /2000
7509C:FFort:RRB1:CM2:Rm 722H:703 305-7478:11/03/2000

CARBARYL
Chemical ID No. 056801; Case 0080

Product Chemistry Chapter of the
Reregistration Eligibility Decision (RED) Document

CARBARYL

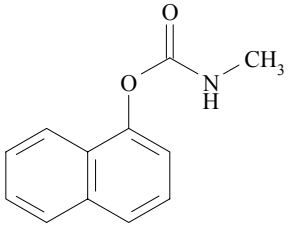
REREGISTRATION ELIGIBILITY DECISION:

PRODUCT CHEMISTRY CONSIDERATIONS

Chemical ID No. 056801; Case No. 0080

DESCRIPTION OF CHEMICAL

Carbaryl [1-naphthyl N-methylcarbamate] is a broad-spectrum insecticide used for control of various insects on numerous varieties of fruits, nuts, and field and vegetable crops.



Empirical Formula:	$C_{12}H_{11}NO_2$
Molecular Weight:	201.2
CAS Registry No.:	63-25-2
Chemical ID No.:	056801

IDENTIFICATION OF ACTIVE INGREDIENT

Carbaryl is a white to light tan solid with a melting point of 142 C, vapor pressure of <0.005 mm Hg at 26 C, specific gravity of 1.23 at 20 C, and octanol/water partition coefficient (K_{oc}) of 217. Carbaryl is soluble in water (40 ppm at 25 C) and in organic solvents including dimethyl formamide (≤45 g/100 mL); acetone, cyclohexanone, and isophorone (≤25 g/100 mL); methylethyl ketone (≤20 g/100 mL); dichloromethane (≤15 g/100 mL); ethanol and ethyl acetate (≤10 g/100 mL); mixed aromatic solvents and xylene (≤3 g/100 mL); and kerosene (≤1 g/100 mL). Carbaryl hydrolyzes rapidly in alkaline solutions.

MANUFACTURING-USE PRODUCTS

A search of the Reference Files System (REFS) conducted 10/25/00 identified 10 carbaryl manufacturing-use products (MPs) registered under Chemical ID No. 056801; the registered carbaryl MPs are listed below in Table 1. Only the registered MPs listed below are subject to a reregistration eligibility decision.

Table 1. Registered Carbaryl Manufacturing-Use Products.

Table 2. Product chemistry data requirements specified in the Carbaryl FRSTR.

Product	OPPTS 830 Guidelines Outstanding
99% T (EPA Reg. No. 264-324)	830.1600, 1620, 1670, 1700, 1750, 1800, 6313, 7000, 7370, and 7950
97.5% T (EPA Reg. No. 264-325)	830.1670, 1750, 1800, 6314, 6316, 6317, 6320, and 7000
80% FI (EPA Reg. No. 264-328)	830.1670, 1750, 1800, 6314, 6316, 6317, 6320, and 7000
99% T (EPA Reg. No. 19713-75)	All Group A and B Guidelines
50% FI (EPA Reg. No. 19713-369) [a]	830.1670, 1750, 1800, 6314, 6316, 6317, 6320, and 7000
97.5% FI (EPA Reg. No. 4816-270)	None; data requirements to be satisfied by the source product.
46% FI (EPA Reg. No. 5481-190)	All Group A and B Guidelines.

[a] Based on data submitted by Aventis.

The current status of the product chemistry data requirements for the carbaryl manufacturing-use products is presented in the attached data summary tables. Refer to these tables for a listing of the outstanding product chemistry data requirements.

CONCLUSIONS

All pertinent product chemistry data requirements are satisfied for the Aventis 99% T, except that data are required for UV/visible absorption (OPPTS 830.7050). For the Aventis 97.5% and 80% FIs, and the Drexel 50% FI, additional data are required concerning product identity and composition, discussion of formation of impurities, certified limits, enforcement analytical method, oxidation/reduction, explodability, storage stability corrosion characteristics, and density (OPPTS 830.1550, 1670, 1750, 1800, 6314, 6316, 6317, 6320, and 7000). Data requirements for the Drexel and Platte 99% Ts, and AgrEvo 97.5% FI, which are repackaged from EPA-registered products, will be satisfied by data for the source products. All product-specific product chemistry data are required for the Sureco 80% FI, Amvac 46% FI, and AgrEvo 1% FI. Provided that the registrants submit the data required in the attached data summary tables for the carbaryl MPs, and either certify that the suppliers of beginning materials and the manufacturing processes for the carbaryl MPs have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, HED has no objections to the reregistration of carbaryl with respect to product chemistry data requirements.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No(s).: 8724
DP Barcode(s): D169720
Subject: Rhone-Poulenc Ag Company: Response to the Carbaryl Reregistration Standard: Residue and Product Chemistry Comments
From: R. Perfetti

Formulation	EPA Reg. No.	Registrant
99% T	264-324	Aventis Ag Company (formerly Union Carbide)
97.5% FI [a]	264-325	
80% FI	264-328	
99% T [b]	19713-75	Drexel Chemical Company
50% FI [c]	19713-369	
99% T [b]	34704-707	Platte Chemical Company Inc.
97.5% FI [b]	4816-270	AgrEvo Environmental Health (formerly Fairfield American)
1% FI	4816-407	
80% FI	769-971	Sureco Inc.
46% FI	5481-190	Amvac Chemical Corporation

[a] Although REFS identifies this product as a technical (T), it is appropriately identified as an formulation intermediate (FI) because it is formulated from a registered technical product.
[b] Repackaged from an EPA-registered product; confirmed for the Drexel 99% T (EPA Reg. No. 19713-75) subsequent to the FRSTR.
[c] Transferred from Aventis (EPA Reg. No. 264-327; 7/15/92).

REGULATORY BACKGROUND

The Carbaryl Reregistration Standard dated 6/11/82 and Guidance Document dated 3/30/84 required additional generic and product-specific product chemistry data for the registered carbaryl MPs. The Carbaryl (FRSTR) Reregistration Standard dated 5/3/88 reviewed data submitted in response to the Guidance Document and summarized the outstanding data requirements for the reregistration of carbaryl. Additional data requirements listed in the FRSTR are presented in Table 2. The FRSTR did not address the AgrEvo 1% FI (EPA Reg. No. 4816-407), which was registered 3/31/72; the Platte 99% T (EPA Reg. No. 34704-707) and Sureco 80% FI (EPA Reg. No. 769-971) were registered subsequent to issuance of the FRSTR.

To: W. Burnam and L. Rossi
Dated: 11/1/91
MRID(s): 41982601

CBRS No(s).: 10083
DP Barcode(s): D179698
Subject: Rhone-Poulenc Ag Company: Response to the Carbaryl Reregistration Standard: Nitrosamine & Stability Considerations.
From: K. Dockter
To: L. Propst/J. Edwards
Dated: 7/14/92
MRID(s): 42318501

CBRS No(s).: 11101
DP Barcode(s): D186160
Subject: Response to the Carbaryl Reregistration Standard: Product Chemistry
From: R. Perfetti
To: L. Rossi and E. Saito
Dated: 1/29/93
MRID(s): None

CBRS No(s).: 11201
DP Barcode(s): D186515
Subject: Response to the Carbaryl Reregistration Standard: Product Chemistry.
From: R. Perfetti
To: L. Rossi and E. Saito
Dated: 4/21/93
MRID(s): 42583901 and 42583902

CBRS No(s).: 12225
DP Barcode(s): D193013
Subject: Carbaryl Reregistration: List A Chemical No. 056801; Case No. 0080. Rhone-Poulenc Response to the Carbaryl Product Chemistry Data Requirements Regarding Dissociation Constant and pH (Guideline Nos. 63-10 and 63-12).
From: F. Toghrol
To: L. Rossi/L. Propst
Dated: 1/26/94
MRID(s): 42832401

CBRS No(s).: 13127
DP Barcode(s): D198578
Subject: Carbaryl. Rhone-Poulenc 1/4/94 Response [62-3 data for EPA Reg. 264-324] to 5/13/93 Agency Letter [RE: 5/3/88 FRSTR] Rereg. Case 0080.
From: K. Dockter
To: J. Loranger
Dated: 4/29/94
MRID(s): 43075801

CBRS No(s).: 15442
DP Barcode(s): D214535
Subject: Carbaryl (056801) Reregistration Case No. 0080, Drexel Request for Product Chemistry Generic Data Exemption (GDE), New Confidential Statement of Formula.
From: S. Hummel
To: J. Loranger/L. Propst
Dated: 5/8/95
MRID(s): None

PRODUCT CHEMISTRY CITATIONS

Bibliographic citations include only MRIDs containing data which fulfill data requirements.

References (cited):

00151776 Union Carbide Agricultural Products Co., Inc. (1984) The Name, Chemical Identity and Composition of the Pesticide Chemical Sevin. Unpublished compilation. 336 p.

41982601 McDaniel, R.; Weiler, D. (1987) Vapor Pressure Determination of Carbaryl: Final Report: Lab Project Number: 40196. Unpublished study prepared by Rhone-Poulenc Ag Co. 35 p.

42318501 Siemann, L. (1992) Product Chemistry on Technical Grade Carbaryl in Support of Registration: Analysis for Nitrosoamines and Stability Study: [Interim Report]: Lab Project Number: 6489-F. Unpublished study prepared by Midwest Research Institute. 26 p.

42583901 Helfant, L. (1992) Sevin Brand 99% Technical Carbaryl Insecticide: Product Identity and Composition Series 61: Lab Project Number: AC-92-014: 41330. Unpublished study prepared by Rhone-Poulenc Ag Co. 42 p.

42583902 Siemann, L. (1992) Product Chemistry on Technical Grade Carbaryl in Support of Registration Analysis for Nitrosoamines and Stability Study: Lab Project Number: 6489-F. Unpublished study prepared by Midwest Research Institute. 149 p.

42832401 Siemann, L. (1993) Carbaryl Product Chemistry: Lab Project Number: 3424-F. Unpublished study prepared by Midwest Research Institute. 21 p.

43075801 Siemann, L. (1993) Method Validation for Analysis of Carbaryl: Lab Project Number: 3521/F. Unpublished study prepared by Midwest Research Institute. 127 p.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	Y	00151776, 42583901 [3]
830.1600	Description of materials used to produce the product	Y	00151776, 42583901 [3]
830.1620	Description of production process	Y	00151776, 42583901 [3]
830.1670	Discussion of formation of impurities	Y	00151776, 42583901 [3]
830.1700	Preliminary analysis	Y	00151776, 42318501 [4], 42583902 [3]
830.1750	Certified limits	Y	00151776, 42583901 [3]
830.1800	Enforcement analytical method	Y	00151776, 43075801 [5]
830.6302	Color	Y	00151776
830.6303	Physical state	Y	00151776
830.6304	Odor	Y	00151776
830.6313	Stability to normal and elevated temperature, metals, and metal ions	Y	00151776, 42318501 [4]
830.6314	Oxidation/reduction: chemical incompatibility	Y	00151776
830.6315	Flammability	N/A [6]	
830.6316	Explodability	Y	00151776
830.6317	Storage stability	Y	00151776
830.6319	Miscibility	N/A [6]	
830.6320	Corrosion characteristics	Y	00151776
830.7000	pH	Y	42832401 [7]
830.7050	UV/visible absorption	N [8]	
830.7100	Viscosity	N/A [6]	
830.7200	Melting point/melting range	Y	00151776
830.7220	Boiling point/boiling range	N/A [6]	
830.7300	Density/relative density/bulk density	Y	00151776
830.7370	Dissociation constants in water	Y	42832401 [7]
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	Y	00151776
830.7840	Water solubility: column elution method; shake flask method	Y	00151776
830.7950	Vapor pressure	Y	00151776, 41982601 [9]

[1] Y = Yes; N = No; N/A = Not Applicable. Aventis indicated (CBRS No. 11101, D186160, 1/29/93, R. Perfetti) that the alternate formulation for which data were required in the FRSTR is no longer produced.

[2] MRID 00151776 was reviewed initially under a HED Memorandum from W.T. Chin dated 9/18/85 and reevaluated in the Carbaryl (FRSTR) Reregistration Standard dated 5/3/88; remaining references were reviewed as noted.

[3] CBRS No. 11201, D186515, 4/21/93, R. Perfetti.

[4] CBRS No. 10083, D179698, 7/14/92, K. Dockter.

[5] CBRS No. 13127, D198578, 4/29/94, K. Dockter.

[6] Data are not required because the T/TGAI is a solid at room temperature.

[7] CBRS No. 12225, D193013, 1/26/94, F. Toghrol.

[8] The OPPTS Series 830, Product Properties Test Guidelines require data pertaining to UV/visible absorption for the PAI.

[9] CBRS No. 8724, D169720, 11/1/91, R. Perfetti.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	N [3]	00151776
830.1600	Description of materials used to produce the product	Y	00151776
830.1650	Description of formulation process	Y	00151776
830.1670	Discussion of formation of impurities	N [4]	00151776
830.1700	Preliminary analysis	N/A [5]	
830.1750	Certified limits	N [3]	00151776
830.1800	Enforcement analytical method	N [6]	00151776
830.6302	Color	Y	00151776
830.6303	Physical state	Y	00151776
830.6304	Odor	Y	00151776
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A [5]	
830.6314	Oxidation/reduction: chemical incompatibility	N	
830.6315	Flammability	N/A [7]	
830.6316	Explodability	N	
830.6317	Storage stability	N	
830.6319	Miscibility	N/A [7]	
830.6320	Corrosion characteristics	N	
830.7000	pH	N	
830.7050	UV/visible absorption	N/A [5]	
830.7100	Viscosity	N/A [7]	
830.7200	Melting point/melting range	N/A [5]	
830.7220	Boiling point/boiling range	N/A [5]	
830.7300	Density/relative density/bulk density	Y	00151776
830.7370	Dissociation constants in water	N/A [5]	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A [5]	
830.7840	Water solubility: column elution method; shake flask method	N/A [5]	
830.7950	Vapor pressure	N/A [5]	

[1] Y = Yes; N = No; N/A = Not Applicable. Although REFS identifies this product as a T, it is appropriately identified as an FI because it is formulated from a registered technical product.

[2] MRID 00151776 was reviewed initially under a HED Memorandum from W.T. Chin dated 9/18/85 and reevaluated in the Carbaryl (FRSTR) Reregistration Standard dated 5/3/88.

[3] Product identity, nominal concentrations and proposed certified limits must be submitted on EPA Form 8570-4.

[4] A discussion must be submitted concerning the possible formation of impurities associated with the inert ingredients in the MP and the potential for formation of nitrosamines in the formulation process or in storage.

[5] Data requirements for the TGAI will be satisfied by data for the technical source product.

[6] Supporting validation data must be submitted for the enforcement method used to quantitate the active ingredient in the formulated product.

[7] Data are not required because the MP is a solid at room temperature.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	N [3]	00151776
830.1600	Description of materials used to produce the product	Y	00151776
830.1650	Description of formulation process	Y	00151776
830.1670	Discussion of formation of impurities	N [4]	00151776
830.1700	Preliminary analysis	N/A [5]	
830.1750	Certified limits	N [3]	00151776
830.1800	Enforcement analytical method	N [6]	00151776
830.6302	Color	Y	00151776
830.6303	Physical state	Y	00151776
830.6304	Odor	Y	00151776
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A [5]	
830.6314	Oxidation/reduction: chemical incompatibility	N	
830.6315	Flammability	N/A [7]	
830.6316	Explodability	N	
830.6317	Storage stability	N	
830.6319	Miscibility	N/A [7]	
830.6320	Corrosion characteristics	N	
830.7000	pH	N	
830.7050	UV/visible absorption	N/A [5]	
830.7100	Viscosity	N/A [7]	
830.7200	Melting point/melting range	N/A [5]	
830.7220	Boiling point/boiling range	N/A [5]	
830.7300	Density/relative density/bulk density	Y	00151776
830.7370	Dissociation constants in water	N/A [5]	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A [5]	
830.7840	Water solubility: column elution method; shake flask method	N/A [5]	
830.7950	Vapor pressure	N/A [5]	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] MRID 00151776 was reviewed initially under a HED Memorandum from W.T. Chin dated 9/18/85 and reevaluated in the Carbaryl (FRSTR) Reregistration Standard dated 5/3/88.

[3] Product identity, nominal concentrations and proposed certified limits must be submitted on EPA Form 8570-4.

[4] A discussion must be submitted of the possible formation of impurities associated with the inert ingredients in the MP and the potential for formation of nitrosamines in the formulation process or in storage.

[5] Data requirements for the TGAI will be satisfied by data for the technical source product.

[6] Supporting validation data must be submitted for the enforcement method used to quantitate the active ingredient in the formulated product.

[7] Data are not required because the MP is a solid at room temperature.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	Y	CSF date not specified CSF dated 8/7/95
830.1600	Description of materials used to produce the product	N/A	
830.1620	Description of production process	N/A	
830.1670	Discussion of formation of impurities	N/A	
830.1700	Preliminary analysis	N/A	
830.1750	Certified limits	N/A	
830.1800	Enforcement analytical method	N/A	
830.6302	Color	N/A	
830.6303	Physical state	N/A	
830.6304	Odor	N/A	
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A	
830.6314	Oxidation/reduction: chemical incompatibility	N/A	
830.6315	Flammability	N/A	
830.6316	Explodability	N/A	
830.6317	Storage stability	N/A	
830.6319	Miscibility	N/A	
830.6320	Corrosion characteristics	N/A	
830.7000	pH	N/A	
830.7050	UV/visible absorption	N/A	
830.7100	Viscosity	N/A	
830.7200	Melting point/melting range	N/A	
830.7220	Boiling point/boiling range	N/A	
830.7300	Density/relative density/bulk density	N/A	
830.7370	Dissociation constants in water	N/A	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A	
830.7840	Water solubility: column elution method; shake flask method	N/A	
830.7950	Vapor pressure	N/A	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] The CSF (date not specified) reviewed under CBRS No. 15442, D214535, 5/8/95, S. Hummel, and an updated CSF dated 8/7/95 (from the product jacket), confirm that this product is repackaged from an EPA-registered product; all data requirements will be fulfilled by data for the source product.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	N [3]	00151776
830.1600	Description of materials used to produce the product	Y	00151776
830.1650	Description of formulation process	Y	00151776
830.1670	Discussion of formation of impurities	N [4]	00151776
830.1700	Preliminary analysis	N/A [5]	
830.1750	Certified limits	N [3]	00151776
830.1800	Enforcement analytical method	N [6]	00151776
830.6302	Color	Y	00151776
830.6303	Physical state	Y	00151776
830.6304	Odor	Y	00151776
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A [5]	
830.6314	Oxidation/reduction: chemical incompatibility	N	
830.6315	Flammability	N/A [7]	
830.6316	Explodability	N	
830.6317	Storage stability	N	
830.6319	Miscibility	N/A [7]	
830.6320	Corrosion characteristics	N	
830.7000	pH	N	
830.7050	UV/visible absorption	N/A [5]	
830.7100	Viscosity	N/A [7]	
830.7200	Melting point/melting range	N/A [5]	
830.7220	Boiling point/boiling range	N/A [5]	
830.7300	Density/relative density/bulk density	Y	00151776
830.7370	Dissociation constants in water	N/A [5]	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A [5]	
830.7840	Water solubility: column elution method; shake flask method	N/A [5]	
830.7950	Vapor pressure	N/A [5]	

[1] Y = Yes; N = No; N/A = Not Applicable. This product was transferred from Aventis (EPA Reg. No. 264-327); the data summary table includes data submitted by Aventis. Drexel must confirm that the manufacturing process and site have not changed since the product transfer; otherwise, all product chemistry data will be required.

[2] MRID 00151776 was reviewed initially under a HED Memorandum from W.T. Chin dated 9/18/85 and reevaluated in the Carbaryl (FRSTR) Reregistration Standard dated 5/3/88.

[3] Product identity, nominal concentrations and proposed certified limits must be submitted on EPA Form 8570-4.

[4] A discussion must be submitted of the possible formation of impurities associated with the inert ingredients in the MP and the potential for formation of nitrosamines in the formulation process or in storage.

[5] Data requirements for the TGAI will be satisfied by data for the technical source product.

[6] Supporting validation data must be submitted for the enforcement method used to quantitate the active ingredient in the formulated product.

[7] Data are not required because the MP is a solid at room temperature.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	Y	CSF dated 4/12/91
830.1600	Description of materials used to produce the product	N/A	
830.1620	Description of production process	N/A	
830.1670	Discussion of formation of impurities	N/A	
830.1700	Preliminary analysis	N/A	
830.1750	Certified limits	N/A	
830.1800	Enforcement analytical method	N/A	
830.6302	Color	N/A	
830.6303	Physical state	N/A	
830.6304	Odor	N/A	
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A	
830.6314	Oxidation/reduction: chemical incompatibility	N/A	
830.6315	Flammability	N/A	
830.6316	Explodability	N/A	
830.6317	Storage stability	N/A	
830.6319	Miscibility	N/A	
830.6320	Corrosion characteristics	N/A	
830.7000	pH	N/A	
830.7050	UV/visible absorption	N/A	
830.7100	Viscosity	N/A	
830.7200	Melting point/melting range	N/A	
830.7220	Boiling point/boiling range	N/A	
830.7300	Density/relative density/bulk density	N/A	
830.7370	Dissociation constants in water	N/A	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A	
830.7840	Water solubility: column elution method; shake flask method	N/A	
830.7950	Vapor pressure	N/A	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] The CSF dated 4/12/91 (from the product jacket) confirms that this product is repackaged from an EPA-registered product; all data requirements will be fulfilled by data for the source product. We note that an updated CSF should be submitted reflecting the nominal concentration of the active ingredient in the product.

Case No. 0080
Chemical No. 056801
Case Name: Carbaryl
Registrant: AgrEvo Environmental Health
Product(s): 97.5% T (EPA Reg No. 4816-270)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	Y	CSF dated 7/24/91
830.1600	Description of materials used to produce the product	N/A	
830.1620	Description of production process	N/A	
830.1670	Discussion of formation of impurities	N/A	
830.1700	Preliminary analysis	N/A	
830.1750	Certified limits	N/A	
830.1800	Enforcement analytical method	N/A	
830.6302	Color	N/A	
830.6303	Physical state	N/A	
830.6304	Odor	N/A	
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A	
830.6314	Oxidation/reduction: chemical incompatibility	N/A	
830.6315	Flammability	N/A	
830.6316	Explodability	N/A	
830.6317	Storage stability	N/A	
830.6319	Miscibility	N/A	
830.6320	Corrosion characteristics	N/A	
830.7000	pH	N/A	
830.7050	UV/visible absorption	N/A	
830.7100	Viscosity	N/A	
830.7200	Melting point/melting range	N/A	
830.7220	Boiling point/boiling range	N/A	
830.7300	Density/relative density/bulk density	N/A	
830.7370	Dissociation constants in water	N/A	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A	
830.7840	Water solubility: column elution method; shake flask method	N/A	
830.7950	Vapor pressure	N/A	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] The CSF dated 7/24/91 (from the product jacket) confirms that this product is repackaged from an EPA-registered product; all data requirements will be fulfilled by data for the source product. We note that an updated CSF should be submitted reflecting the nominal concentration of the active ingredient in the product.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	N	CSF dated 7/24/91
830.1600	Description of materials used to produce the product	N	
830.1650	Description of formulation process	N	
830.1670	Discussion of formation of impurities	N	
830.1700	Preliminary analysis	N/A [3]	
830.1750	Certified limits	N	
830.1800	Enforcement analytical method	N	
830.6302	Color	N	
830.6303	Physical state	N	
830.6304	Odor	N	
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A [3]	
830.6314	Oxidation/reduction: chemical incompatibility	N	
830.6315	Flammability	N	
830.6316	Explodability	N	
830.6317	Storage stability	N	
830.6319	Miscibility	N	
830.6320	Corrosion characteristics	N	
830.7000	pH	N	
830.7050	UV/visible absorption	N/A [3]	
830.7100	Viscosity	N	
830.7200	Melting point/melting range	N/A [3]	
830.7220	Boiling point/boiling range	N/A [3]	
830.7300	Density/relative density/bulk density	N	
830.7370	Dissociation constants in water	N/A [3]	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A [3]	
830.7840	Water solubility: column elution method; shake flask method	N/A [3]	
830.7950	Vapor pressure	N/A [3]	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] The CSF dated 7/24/91 (from the product jacket) confirms that this product is formulated from an EPA-registered product.

[3] TGAI data requirements will be satisfied by data for the technical source product.

Case No. 0080
Chemical No. 056801
Case Name: Carbaryl
Registrant: Sureco Inc.
Product(s): 80% FI (EPA Reg No. 769-971)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	N	CSF dated 9/23/94
830.1600	Description of materials used to produce the product	N	
830.1650	Description of formulation process	N	
830.1670	Discussion of formation of impurities	N	
830.1700	Preliminary analysis	N/A [3]	
830.1750	Certified limits	N	
830.1800	Enforcement analytical method	N	
830.6302	Color	N	
830.6303	Physical state	N	
830.6304	Odor	N	
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A [3]	
830.6314	Oxidation/reduction: chemical incompatibility	N	
830.6315	Flammability	N	
830.6316	Explodability	N	
830.6317	Storage stability	N	
830.6319	Miscibility	N	
830.6320	Corrosion characteristics	N	
830.7000	pH	N	
830.7050	UV/visible absorption	N/A [3]	
830.7100	Viscosity	N	
830.7200	Melting point/melting range	N/A [3]	
830.7220	Boiling point/boiling range	N/A [3]	
830.7300	Density/relative density/bulk density	N	
830.7370	Dissociation constants in water	N/A [3]	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A [3]	
830.7840	Water solubility: column elution method; shake flask method	N/A [3]	
830.7950	Vapor pressure	N/A [3]	

[1] Y = Yes; N = No; N/A = Not Applicable. A letter from L. Howard, Aventis, to D. Edwards, EPA, dated 9/14/94 authorizes use of Aventis data to satisfy data requirements for this product; however, until a determination concerning substantial similarity for the two products has been made, all product chemistry data requirements remain outstanding.

[2] The CSF available from the product jacket confirms that this product is formulated from an EPA-registered product.

[3] TGAI data requirements will be satisfied by data for the technical source product.

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product identity and composition	N	CSF dated 5/18/84
830.1600	Description of materials used to produce the product	N	
830.1650	Description of formulation process	N	
830.1670	Discussion of formation of impurities	N	
830.1700	Preliminary analysis	N/A [3]	
830.1750	Certified limits	N	
830.1800	Enforcement analytical method	N	
830.6302	Color	N	
830.6303	Physical state	N	
830.6304	Odor	N	
830.6313	Stability to normal and elevated temperature, metals, and metal ions	N/A [3]	
830.6314	Oxidation/reduction: chemical incompatibility	N	
830.6315	Flammability	N	
830.6316	Explodability	N	
830.6317	Storage stability	N	
830.6319	Miscibility	N	
830.6320	Corrosion characteristics	N	
830.7000	pH	N	
830.7050	UV/visible absorption	N/A [3]	
830.7100	Viscosity	N	
830.7200	Melting point/melting range	N/A [3]	
830.7220	Boiling point/boiling range	N/A [3]	
830.7300	Density/relative density/bulk density	N	
830.7370	Dissociation constants in water	N/A [3]	
830.7550	Partition coefficient (*n*-octanol/water), shake flask method	N/A [3]	
830.7840	Water solubility: column elution method; shake flask method	N/A [3]	
830.7950	Vapor pressure	N/A [3]	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] The CSF dated 5/18/84 (from the product jacket) confirms that this product is manufactured from an EPA-registered product.

[3] TGAI data requirements will be satisfied by data for the technical source product.

CARBARYL
Chemical ID No. 056801; Case 0080

Residue Chemistry Chapter of the
Reregistration Eligibility Decision (RED) Document

CARBARYL

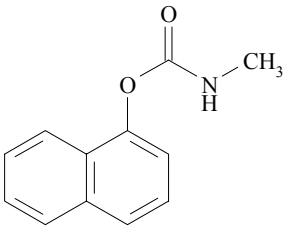
REREGISTRATION ELIGIBILITY DECISION

RESIDUE CHEMISTRY CONSIDERATIONS

PC Code 056801; Case 0080

TABLE OF CONTENTS page

CARBARYL



REREGISTRATION ELIGIBILITY DECISION

RESIDUE CHEMISTRY CONSIDERATIONS

PC Code No. 056801; Case 0080

INTRODUCTION

Carbaryl (1-naphthyl N-methylcarbamate) is a carbamate insecticide registered for use on a variety of field, fruit, and vegetable crops. The reregistration of carbaryl in the United States is being supported by the Aventis Crop Science (basic producer); the Interregional Research Project No. 4 (IR-4) is additionally supporting the reregistration of carbaryl use on a few selected minor crops. Carbaryl products are marketed under trade names such as Sevin® and Sevimol®. Registered carbaryl end-use formulations include flowable concentrates (FlC), granulars (G), pelleted/tableted (P/T), ready-to-use (RTU), and wettable powders (WP). Depending on the crop, these formulations may be applied as dormant, delayed dormant, prebloom, foliar (broadcast, banded, and directed spray), post-harvest treatment (dip), soil (broadcast and banded), premise treatment, and direct animal treatment using ground or aerial equipment. Carbaryl may be applied on agricultural and residential use sites.

REGULATORY BACKGROUND

Carbaryl was the subject of a Reregistration Standard Guidance Document dated 3/30/84; the Residue Chemistry Science Chapter of the Guidance Document was dated 3/15/83. The Residue Chemistry Chapter of the Carbaryl (FRSTR) Reregistration Standard was issued on 5/3/88. A Data Call-In (DCI) Notice for carbaryl was also issued 4/91. These documents summarized the regulatory conclusions based on available residue chemistry data, and specified the additional data required for reregistration purposes. Several data submissions have been received and evaluated since the FRSTR. The information contained in this document outlines the Residue Chemistry Science Assessments with respect to the reregistration of carbaryl.

Tolerances for residues of carbaryl are currently expressed in terms of carbaryl (1-naphthyl N-methylcarbamate), including its hydrolysis product 1-naphthol, calculated as carbaryl, for most raw crop commodities [40 CFR §180.169(a)]. The established tolerances for residues in/on pineapples, pome fruits, avocados, and fresh dill are expressed in terms of carbaryl *per se* [40 CFR §180.169(d) and (e)]. Tolerances for residues in livestock commodities are expressed as

carbaryl, including its metabolites 1-naphthol (naphthyl sulfate), 5,6-dihydrodihydroxy carbaryl, and 5,6-dihydrodihydroxy naphthol, calculated as carbaryl [40 CFR §180.169(b) and (c)]. A tolerance for residues in pineapple bran is expressed in terms of carbaryl *per se* [40 CFR §186.550]. An interim tolerance has been established for carbaryl and its 1-naphthol metabolite in eggs [40 CFR §180.319].

Since the FRSTR was issued, the Agency has updated the list of raw agricultural and processed commodities and feedstuffs derived from crops (Table 1, OPPTS 860.1000). As a result of changes to Table 1, additional carbaryl residue data are now required for some commodities; these data requirements have been incorporated into this document. These new data requirements will be imposed at the issuance of the Carbaryl RED but should not delay on the reregistration eligibility decisions for carbaryl. The need for revisions to dietary exposure/risk assessments will be determined upon receipt of the required residue chemistry data.

SUMMARY OF SCIENCE FINDINGS

GLN 860.1200: Directions for Use

A REFS search, conducted on 1/5/2000, identified 15 carbaryl end-use products (EPs) registered under FIFRA Section 3 to the basic producer, Aventis Ag Company, with registered uses on food/feed crops. These EPs, including the associated Special Local Need (SLN) registrations under FIFRA Section 24 (c), are listed in Table A1.

Table A1. Carbaryl EPs with Food/Feed Uses Registered to Aventis Ag Company.

EPA Reg. No.	Label Acceptance Date [1]	Formulation	Product Name
234-312	6/99	10.04% P/T	Sevin® brand 10% Bait Carbaryl Insecticide
264-314	6/99	50% WP	Sevin® brand 50W Carbaryl Insecticide
264-315	6/99	85% WP	Sevin® brand 85 Sprayable Carbaryl Insecticide
264-316 [2]	1/00	80% WP	Sevin® brand 80S Carbaryl Insecticide
264-320	6/99	5% P/T	Sevin® brand 5% Bait Carbaryl Insecticide
264-321	6/99	4 lb/gal FlC	Sevimol® brand Carbaryl Insecticide
264-333	2/01	4 lb/gal FlC	Sevin® brand XLR Carbaryl Insecticide
264-334	2/99	2 lb/gal FlC	Sevin® brand RP2 Carbaryl Insecticide
264-335	10/00	4 lb/gal FlC	Sevin® brand RP4 Carbaryl Insecticide
264-349 [3]	1/00	4 lb/gal FlC	Sevin® brand 4F Carbaryl Insecticide
264-422	4/97	4 lb/gal RTU	Sevin® brand 4-Oil ULV Carbaryl Insecticide
264-427	9/96	3.2 lb/gal RTU	Sevin® brand 4-Oil 41A Carbaryl Insecticide
264-429	3/99	7% G	Sevin® brand Granular Carbaryl Insecticide For Commercial Use Only
264-430	3/99 [6]	7% G	Sevin® brand Granular Carbaryl Insecticide For Outdoor Home Use
264-526	4/00	80% WP	Sevin® brand 80 WSP Carbaryl Insecticide

[1] Date of the most recently EPA-approved label submitted by the basic producer which corresponds to the most recently EPA-approved label date found in REFs, unless specified otherwise.
[2] Including SLN Nos. CA810059, FL890036, and WA900013.
[3] Including SLN No. FL890037.

A review of the labels listed above and supporting residue data indicate that the following label amendments are required:

Based on acceptable residue data on okra from IR-4, the registrant should amend use directions on FlC and WP labels to specify a maximum of four applications per season at 1.5 lb ai/A/application at a minimum retreatment interval (RTI) of 6 days and a minimum PHI of 3 days.

Use directions for oysters on the 80%WP label (SLN WA900013) concerning the PHI should be amended to read "treatment is allowed only on beds from which no oysters will be harvested within one year of application."

A comprehensive summary of the registered food/feed use patterns of carbaryl, based on the product labels registered to Aventis, is presented in Table A2. A tabular summary of the residue chemistry science assessments for reregistration of carbaryl is presented in Table B. The conclusions listed in Table B regarding the reregistration eligibility of carbaryl food/feed uses are based on the use patterns registered by the basic producer, Aventis. When end-use product DCIs are developed (e.g., at issuance of the RED), all end-use product labels (e.g., MAI labels, SLNs,

and products subject to the generic data exemption) should be amended such that they are consistent with the basic producer's labels.

GLN 860.1300: Nature of the Residue - Plants

The reregistration requirements for plant metabolism are fulfilled. Acceptable metabolism studies depicting the qualitative nature of the residues in lettuce, radish, and soybean have been submitted and evaluated.

In these studies (all conducted at ~1x rates), surface residues on radish tops, lettuce, and soybean forage accounted for 38-67% of the total radioactive residues (TRR), and virtually all of these residues were unconjugated carbaryl. Unconjugated carbaryl ranged from 36-95% of the TRR in all commodities of radish, lettuce, and soybean, with the exception of soybean seed, in which the parent accounted for only 4% of the TRR. Other unconjugated residues, including N-(hydroxymethyl) carbaryl (N-OH-Me carbaryl), 1-naphthol, and 5,6-dihydro-dihydroxy-1-naphthol, were present in minor amounts (≤3.4% of the TRR).

Conjugated carbaryl accounted for ≤2.8% of the TRR in the tested commodities. Other conjugates detected in plants included a malonylglycoside conjugate of 1-naphthol comprising 26% of the TRR in soybeans; a hexose conjugate of N-OH-Me carbaryl accounting for 17% and 12.2% of the TRR in soybeans and soybean hay; and several minor conjugates of desmethyl carbaryl, 5-hydroxycarbaryl, and 4-hydroxycarbaryl, each at ≤2.7% of the TRR.

Based on the available metabolism data, the HED Metabolism Committee (S. Hummel, 2/8/96) determined that tolerances for crop commodities should be expressed as residues of carbaryl *per se*. The carbaryl metabolite, N-hydroxymethyl carbaryl does not need to be regulated because it is expected to have considerably less potential as a cholinesterase inhibitor (based on *in vitro* studies). As noted above, conjugated carbaryl does not contribute significantly to the TRR, and is not of concern.

GLN 860.1300: Nature of the Residue - Livestock

The reregistration requirements for livestock metabolism are fulfilled. Acceptable metabolism studies depicting the qualitative nature of the residues in ruminants and poultry have been submitted and evaluated. The metabolic pathways for carbaryl in plants and livestocks are similar, but are more extensive in livestocks.

In the ruminant metabolism study, lactating cows were orally dosed with 1-naphthyl-[^{14}C]carbaryl at dietary levels of 10-100 ppm for 14 days. The high-dose group represents approximately a 0.8x feeding level based on current tolerance levels. The Metabolism Assessment Review Committee (6/17/99)concluded that tolerances for ruminant meat and milk should be expressed as residues of free and conjugated forms of carbaryl, 5,6-dihydro-5,6-dihydroxy carbaryl, and 5-methoxy-6-hydroxy carbaryl. The tolerance expression should be modified to reflect these changes.

Currently, no tolerances are needed for residues of carbaryl in/on poultry; the presently registered uses of carbaryl are classified as Category 3 of 40 CFR §180.6(a) with respect to the need for tolerances in poultry and eggs i.e., there is no reasonable expectation of finite residues.

GLN 860.1340: Residue Analytical Methods

The available methods for tolerance enforcement (PAM, Volume II, Methods I through IV, A, and B) measure total combined residues of carbaryl and 1-naphthol, calculated as carbaryl. The requirement for acceptable enforcement methods which determine residues of carbaryl *per se* in plant and livestock commodities remains outstanding. Athough some analytical methods determine the combined residue of carbaryl and 1-naphthol, it should be noted that 1-napthol is a very minor part of the residue; therefore, the plant commodity tolerances, which are based on carbaryl only, are not greatly exaggerated.

The registrant has proposed as an enforcement method HPLC Method CACR-0194, which quantifies carbaryl *per se* in plant matrices. This method has undergone successful independent laboratory validation (ILV) using samples of representative plant commodities (oily and non-oily matrices), and has also been successfully radiovalidated using samples from plant metabolism studies. The method should be submitted to the Agency for method validation.

Residue data on most crop plants and processed commodities have been collected using the above HPLC method with only minor modifications involving changes in solvents and cleanup procedures. Method CACR-1212, a modification of CACR-0194, has also been used to generate data on residues of carbaryl *per se* in some of the recent residue studies. The two methods are identical except that with method CACR-1212 residues are extracted with ethyl acetate instead of DCM, and cleanup procedures use deactivated rather than activated Florisil. The carbaryl-HPLC-alfalfa method, described in the FRSTR, was used to generate data for earlier residue studies. This method does not distinguish between carbaryl and 1-naphthol; however, the Agency concluded (DP Barcode D194407, S. Hummel, 2/25/94) that the contribution of residues of 1-naphthol is insignificant relative to residues of carbaryl *per se*.

The registrant must also propose an enforcement method for determining residues of free and conjugated forms of carbaryl, 5,6-dihydro-5,6-dihydroxy carbaryl, and 5-methoxy-6-hydroxy carbaryl in livestock commodities. An adequate HPLC data collection method (Aventis File No. 45186) used to determine residues of carbaryl (free and conjugated) and its metabolites in livestock commodities is available, and has undergone a successful ILV. The method is similar to method CARDC-1286 which was described in a recent Agency review (C. Olinger, 12/13/99). Once the modified method has been submitted, the Agency will initiate a method validation.

GLN 860.1360: Multiresidue Methods

The FDA PESTDATA database indicates that residues of carbaryl *per se* are completely recovered using FDA Multiresidue Protocols A and D (PAM I Sections 242.2 and 232.4). No data are available concerning the recovery of carbaryl by Protocol E (PAM I Section 211.1 and 211.2). These PAM I methods are not expected to recover conjugated carbaryl residues.

GLN 860.1380: Storage Stability Data - Plants

The requirements for storage stability data are not satisfied for purposes of reregistration. Additional data are required depicting the storage stability of carbaryl *per se* in an oilseed, processed commodities of an oily crop, and a dried fruit stored for up to 10 months.

In addition, the registrant is relying on earlier magnitude of the residue studies that are not supported by the existing storage stability data; therefore, additional storage stability data are required. The required data must reflect storage intervals of 18 months for alfalfa commodities, 15 months for potatoes, 22 months for wheat commodities, and 33 months for rangeland grass. In addition, if the registrant wishes to rely on the previously submitted sugar beet processing study, information pertaining to sample conditions and intervals for the study must be submitted.

Adequate storage stability data have been submitted indicating that residues of carbaryl are relatively stable under frozen storage conditions (-20 C) for up to 12 months in/on pearled barley and barley flour, head lettuce, potatoes, tomatoes and tomato processed commodities, and wheat forage, hay, and straw. Residue decline was observed in tomato dry pomace after 3 months storage (~30-40%), and barley grain and peanut hulls after 3 months of storage (~50% and 40%, respectively; these commodities are no longer considered to be significant livestock feed items. In a separate study, carbaryl residues were shown to be stable in/on wheat grain stored at -20 C for up to 7 months.

Adequate storage stability data have been submitted indicating that weathered residues of carbaryl *per se* are stable at -20 C for at least 15 months in/on apple fruit, juice, and wet and dry pomace; 13 months in/on grapes; 12 months in/on processed raisins; 11 months in/on almond nutmeat and hulls, and dry bean hay; and 10 months in/on dry bean vines.

GLN 860.1380: Storage Stability Data - Livestock

For the purpose of reregistration, the requirements for storage stability data for carbaryl residues in livestock commodities are partially satisfied. Additional information on the storage intervals prior to analysis for metabolite residues in the cattle feeding study is required. Samples from the feeding study were analyzed for carbaryl *per se* within the interval of known stability of free carbaryl residues.

The storage stability studies conducted to date indicate that residues of unconjugated carbaryl and metabolites are less stable than conjugated residues. A storage stability study submitted in conjunction with the ruminant feeding study indicated that residues of carbaryl *per se* are relatively stable in frozen storage for up to 3 months in milk, fat, and muscle and up to 1 month in kidney. Residues of carbaryl *per se* in liver declined ~69% after 2 weeks of storage and continued to decline over the 3-month storage interval (94% decline). Tissue and milk samples from the ruminant feeding study were stored frozen for ≤21 days (9 days for liver) prior to carbaryl analysis. The data indicate that conjugated carbaryl-related residues are relatively stable in frozen storage for up to 158 days in muscle, 173 days in liver, 196 days in kidney, 215 days in fat, and

248 days in milk. A method equivalency study using samples from the feeding study adequately demonstrated that unconjugated residues are not a significant portion of carbaryl residues in liver.

GLN 860.1500: Crop Field Trials

Aventis CropScience submitted data to support the use of granular (G) formulations for postemergence applications to several food/feed crops. HED (DP Barcode D240441, C. Olinger, 1/22/98) required the registrant to conduct one side-by-side trial comparing a granular formulation and a spray formulation for each crop group and miscellaneous crop. To these uses, Aventis CropScience submitted data comparing carbaryl residues in/on asparagus, cabbage, sweet corn, leaf lettuce, black-eyed peas, squash, strawberries, tomatoes, and turnips following multiple applications of either a 4 lb/gal flowable concentrate (FlC) or 10% granular (G) formulation in side-by-side tests.

A total of nine side-by-side tests using a 10% G and 4 lb/gal FlC were conducted on crops representing major field crop groups and miscellaneous commodities (asparagus, cabbage, sweet corn, peas, squash, strawberry, tomato and turnip). The tests were conducted at the maximum label rate specified on the label for the 4 lb/gal FlC (EPA Reg No. 264-333) and were conducted in a major growing region for each crop.

Carbaryl residues resulting from application of the 10% G formulation were substantially lower than from the FlC formulation in/on 9 of the 14 commodities analyzed (asparagus, cabbage w/o wrapper leaves, sweet corn forage, pea hay and dried seeds, squash, strawberries, tomatoes and turnip tops) and were similar in 2 other commodities (sweet corn K+CWHR and fodder). Although residues of the 10% G formulation were higher than residues from the side by side trial for cabbage (w/ wrapper leaves) and turnip root, the residues were similar or lower than residues found in the residue field trials submitted to the Agency in support of tolerances in/on turnip and cabbage.

The data submitted are not adequate to support the use of granular (G) formulations of carbaryl on leafy vegetables. Residues of carbaryl found in leaf lettuce were not consistent. Both samples of lettuce from the 10% G treatment had substantially higher residues (37.01 and 47.22 ppm) than one of the samples treated with the FlC (23.25 ppm). Additionally, all residues were significantly above the current tolerance of 10 ppm.and all residue data submitted in support of the tolerance in lettuce (<8.85 ppm). No explanation for the higher residues was given by the registrant. The registrant may elect to repeat the side by side trial on leaf lettuce again or submit a rationale for the results of the leaf lettuce study.

In addition, conclusions regarding the adequacy of the data for alfalfa, apples, potatoes, wheat processed commodities, grasses, and soybean processed commodities are contingent upon receipt and acceptance of adequate supporting storage stability data.

For the purpose of reregistration, adequate magnitude of the residue data are available on the following crops: alfalfa, almond, asparagus, bananas, beans (dried and succulent), blueberry, broccoli, cabbage, celery, cherry, citrus fruits, clover, corn (sweet and field), cucurbits (cantaloupes, cucumbers and squash), cranberry, flax, grape, okra, peanut, peas (dried and

succulent), pecan, pepper, pistachio, pome fruits, potato, prickly pear cactus, raspberry, rice, sorghum, soybean, spinach, stone fruits, strawberry, sunflower, sweet potato, tobacco, tomato, and walnut.

Adequate field trial data depicting carbaryl residues following applications made according to the maximum or proposed use patterns have been submitted for these commodities. Geographic representation is adequate and a sufficient number of trials reflecting representative formulation classes were conducted. Carbaryl residues were <LOQ in/on sweet potato, sugar beets, corn grain, flax seed, and peanuts. Quantifiable residues were detected in all other RACs. For a given crop, residue levels were quite variable overall, probably owing to climactic variations, but were generally consistent within any specific field trial location.

In addition to the required field trial data, an adequate [^{14}C]-carbaryl tobacco pyrolysis study has been conducted.

Adequate data are available to reassess the tolerances for residues of carbaryl in/on sugar beet roots and tops provided that use directions on five currently approved labels are modified to allow a maximum of two applications per season at 1.5 lb ai/A/application and a PHI of 28 days. The registrant has proposed (Letter from Aventis to J. Loranger, 6/1/94) amending all EP labels to conform to these requirements, and the Greybeard Committee (1/9/97) has granted a waiver from the requirement of additional field trials provided that the labels are amended. Alternatively, residue data are required depicting residues of carbaryl *per se* in/on sugar beet roots and tops harvested 28 days following four applications totaling 4.0 lb ai/A (1x the maximum seasonal rate). A total of 12 tests should be conducted in the following areas: Region 5 (5 tests), Regions 7, 8, and 9 (one test each), and Regions 10 and 11 (2 tests each).

Adequate residue data on representative Brassica and leafy vegetables are available to support uses on other vegetable commodities with the same carbaryl use pattern: Adequate data on broccoli will be translated to support the uses on Brussels sprouts, cauliflower, and kohlrabi; data on spinach will support tolerances on dandelion and parsley; and residue data on lettuce will be translated to endive.

The available data from alfalfa will be translated to support uses on birdsfoot trefoil.

The following data on grasses are available for risk assessment/reregistration purposes: Residue data from rangeland grass field trials support the current tolerance of 100 ppm in/on grass forage. Data on pasture hay harvested at the 14-day PHI indicate that the tolerance on grass hay should be lowered to 15 ppm.

The registrant has provided data on pasture grass forage harvested at a PHI of 14 days. For postemergence applications to grasses, the Agency currently considers feeding restrictions and PHIs greater than zero days impractical for forage of pasture and rangeland grasses. Grass forage tolerances are set using residue data from a 0-day post-treatment interval. However, reasonable PHIs are allowed for the cutting of grass hay.

Adequate data are available to reassess the tolerances for residues of carbaryl in/on dried beans, cowpeas, lentils and peas with pods. These data support the establishment of crop subgroup

tolerances for edible-podded legume vegetables (6A), and for dried, shelled pea and bean except soybean (6C). However, additional residue data are required if the registrant seeks tolerances for residues in/on succulent, shelled pea and bean commodities. A total of 12 tests, six tests each on a succulent, shelled cultivar of bean and garden pea, are required to support a tolerance for residues in/on the succulent, shelled pea and bean crop subgroup (6B). The registrant is referred to OPPTS GLN 860.1500 for the required number and distribution of tests.

Data are available to reassess the tolerances for residues in/on soybean forage and hay. To establish a tolerance for residues in/on the foliage of legume vegetables except soybeans crop subgroup (7A), the guidelines state that three field trials each are required on any cultivar of bean and field pea. Although data from forage and hay of field pea are not available, data from seven field trials depicting residues in/on bean forage (vines) and hay are adequate to satisfy the guidelines for a tolerance on the crop subgroup 7A. The use patterns are the same for forage and hay of peas and beans.

Adequate data are available to reassess the tolerance for wheat forage and straw. However, the Agency now considers wheat hay to be a livestock feed item. (OPPTS GLN 860.1000 Table 1.). A full set of 20 field trials as specified in OPPTS GLN 860.1500 is required depicting carbaryl residues in/on wheat hay. When all the field trials are complete, PHIs and tolerances for hay based on the field trial data should be proposed. Data on wheat hay will be translatable to proso millet hay.

The registrant intends to support a tolerance for residues of carbaryl in/on imported pineapples (Aventis personal communication with C. Olinger, 9/24/98 SMART meeting). Residue data are required depicting residues in/on pineapples following application of carbaryl at the maximum use rate and minimum PHI. Five trials must be submitted, three from Costa Rica and two from Mexico.

The registrant does not intend to support carbaryl uses on avocados, barley, maple sap, oats, rye, and sweet sorghum; however, IR-4 has indicated (Correspondence from K. Dorschner, IR-4 Project, 9/15/94) that they may fulfill the residue data requirements for some of these commodities. These data have not been submitted.

GLN 860.1520: Processed Food/Feed

Pending adequate resolution of the outstanding storage stability issues noted above, the reregistration requirements for magnitude of the residue data in processed food/feed commodities are fulfilled for citrus fruits, corn, flaxseed, grape, olive, peanut, plum, pome fruits, rice, sorghum, soybean, sugar beet, sunflower, potato, tomato, and wheat. Based on the available processing studies, tolerances are required for residues in citrus fruit oil, raisins, wet apple pomace, and rice hulls only.

In a tomato processing study, carbaryl residues concentrated by 2x in puree. However, when this concentration factor is applied the HAFT residues of 2.45 ppm for tomatoes, the resulting value is

lower than the reassessed tolerance (5.0 ppm) for residues in/on fruiting vegetables. Therefore, a separate tolerance for residues in puree is not required.

In an apple processing study, carbaryl residues concentrated in wet apple pomace by 1.3x. Based on this concentration factor and the current HAFT residues of 10.6 ppm in/on apples, an appropriate tolerance for carbaryl residues in wet apple pomace is 15.0 ppm. Residues did not concentrate in apple juice.

Data from the citrus fruit processing study indicate that residues of carbaryl concentrate in citrus oil by 2.4x. Based on this concentration factor and the current HAFT residues of 8.09 ppm in/on citrus fruit, an appropriate tolerance for carbaryl residues in citrus oil is 20.0 ppm. Residues did not concentrate in dried pulp or juice.

Data from adequate grape processing studies indicate that residues of carbaryl do not concentrate in grape juice; however, carbaryl residues concentrate by 1.4x in raisins. Based on the current HAFT residues of 7.94 ppm in/on grapes, carbaryl residues in raisins could be expected to reach 11.1 ppm. A 12.0 ppm tolerance for carbaryl residues in raisins should be established. Residues did not concentrate in dried pulp or juice.

A rice processing study indicated that residues of carbaryl do not concentrate in polished rice or bran, but concentrate in rice hulls by 2.4x. Based on this concentration factor and the current HAFT residues of 11.0 ppm in/on rice grain, residues in rice hulls could be expected to reach 26.4 ppm; therefore, an appropriate tolerance for carbaryl residues in rice hulls is 30.0 ppm.

Data from a wheat processing study indicate that carbaryl residues in/on wheat aspirated grain fractions are 11.8x higher than in/on wheat grain. Based upon HAFT residues of 0.27 ppm, residues of carbaryl may be expected to reach 3.2 ppm in wheat aspirated grain fractions. Adequate soybean aspirated grain fraction data are available and indicate that residues of carbaryl in/on soybean aspirated grain fractions are 5.6x higher than in soybean seed. Based on HAFT residues of 0.15 ppm, residues of carbaryl may be expected to reach 0.8 ppm in soybean aspirated grain fractions. For grain sorghum, the concentration factor between the aspirated grain fractions and the whole grain samples was 7.4x. Based on HAFT residues of 9.55 ppm, residues of carbaryl could be expected to reach 70.2 ppm in sorghum aspirated grain fractions. As carbaryl residues were nondetectable (<0.02 ppm) in/on all samples of field corn grain from field trials conducted at the maximum labeled use rate (8.0 lb ai/A, MRID 44058001), no carbaryl residue data on aspirated grain fractions derived from field corn grain are required. Based on these data, a tolerance of 70 ppm should be established for residues of carbaryl *per se* in/on aspirated grain fractions.

GLN 860.1480: Meat, Milk, Poultry, Eggs

The reregistration data requirements for magnitude of the residue in livestock commodities are fulfilled.

The presently registered uses of carbaryl are classified as Category 3 of 40 CFR §180.6(a) with respect to the need for tolerances in poultry and eggs i.e., there is no reasonable expectation of finite residues.

Based upon the established or reassessed tolerances for carbaryl residues in/on livestock feed items, the calculated maximum theoretical dietary burdens for livestock are presented below:

Calculation of maximum dietary burdens of livestock for carbaryl.

Feed Commodity	% Dry Matter [a]	% Diet [a]	Tolerance (ppm) [b]	Dietary Contribution (ppm) [c]
Beef and Dairy cattle				
grass, forage	25	60	100.0	240.00
cowpea seed	88	20	5.0	1.1
Aspirated grain fraction	85	20	70.0	16.0
TOTAL BURDEN		100		**257.1**
Swine				
sorghum grain	N/A	85	10.0	8.5
cowpea forage	N/A	15	60.0	9.0
TOTAL BURDEN		100		**17.5**

[a] Table 1 (August 1996).
[b] Current or reassessed tolerance from Table C.
[c] Contribution = [tolerance / % DM (if cattle)] X % diet).

An adequate ruminant feeding study is available reflecting the dosing of dairy cattle for 28 days at levels equivalent to 114, 342, and 1140/570 ppm in the diet (the high-dose level was reduced to 570 ppm on Day 5 due to toxic effects observed in study animals). These dosing levels represent 0.4x, 1.3x, and 4.4/2.2x the theoretical dietary burden for cattle, and 6.5x, 19.5x, and 65.1/32.6x the theoretical dietary burden for swine. The calculation of the maximum dietary is tentative because data remain outstanding for pasture grass forage.

Based upon the results of this study, tolerances for residues of carbaryl *per se* in livestock (excluding swine) commodities should be reassessed as follows: 1.0 ppm for milk, 0.5 ppm for fat, 1.0 ppm for meat, and 3.0 ppm for meat byproducts.

Using the results of the feeding study to reassess tolerances for swine, tolerances for residues of carbaryl *per se* in swine commodities should be reassessed as follows: 0.05 ppm for fat, 0.1 ppm for meat, and 0.5 ppm for meat byproducts.

GLN 860.1400: Water, Fish, and Irrigated Crops

Adequate residue data are available to support the use of carbaryl on oyster beds in WA. No residue data are required for catfish or crayfish from the use of carbaryl on rice since this use is prohibited on the carbaryl labels.

GLN 860.1460: Food Handling

Carbaryl is presently not registered for use in food-handling establishments; therefore, no residue chemistry data are required under this guideline topic.

GLNs 860.1850 and 860.1900: Confined/Field Accumulation in Rotational Crops

An adequate confined rotational crop study is available, and no additional rotational crop studies are required. The current label restriction against rotating crops for which carbaryl is not registered is adequate.

Table A2. Food/Feed Use Patterns on EP Labels Subject to Reregistration for Carbaryl (Case 0080). [1]

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Food/Feed Crop Uses						
Alfalfa						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal Fl/C [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	1 per cutting	1.5 lb/A per cutting	7	

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Almond, chestnut, filbert, pecan, walnut						
Foliar, dormant/delayed dormant Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	5.0 lb/A	4	15.0 lb/A	14	A maximum of four applications may be made (including dormant/delayed dormant applications) with a minimum 7-day retreatment interval. For almonds only, dormant/delayed dormant applications may be made in combination with dormant oil.
Foliar application Ground	50% WP [CA830007] 80% WP [CA830007]	1.0 lb/100 gal	NS	NS	1 (for nut crops)	Use limited to CA for nut crops. Applications may be made at 7-day retreatment intervals or as needed.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Apricot, cherry, nectarine, peach, plum/prune						
Foliar and dormant/delayed dormant Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	3.0 lb/A 4.0 lb/A (CA only) 5.0 lb/A (dormant/delayed only)	3 (foliar) and 1 (dormant/ delayed dormant)	14.0 lb/A	3 (except CA) 1 (CA only)	A maximum of three foliar applications and one dormant/delayed dormant application may be made with a minimum 7-day retreatment interval (14 days in CA). A maximum seasonal rate of 14.0 lb ai/A (5.0 lb ai/A during dormant/delayed dormant period and 9.0 lb ai/A during production season) has been established.
Foliar application Ground	50% WP [CA830007] 80% WP [CA830007]	1.0 lb/100 gal	NS	NS	3	Use limited to CA. Applications may be made at 7-day retreatment intervals or as needed.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Asparagus						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	3	6.0 lb/A 3.0 lb/A for 5% P/T only	1	A maximum of three applications may be made prior to harvest or a maximum of five applications may be made per crop with a minimum 3-day retreatment interval.
Postharvest Ground or aerial			2	10.0 lb/A	Not applicable (NA)	

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Asparagus (continued)						
Postharvest (to fern or brush growth) Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	4.0 lb/A	5	10.0 lb/A	NA	A maximum of five applications may be made per crop (spears and ferns combined) with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	1	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.
Avocado						
Foliar application Ground	50% WP [CA830007] 80% WP [CA830007]	1.0 lb/100 gal	5	NS	5	Use limited to CA. Applications may be made at 7-day retreatment intervals or as needed.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Bean, cowpea, pea						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312]	1.5 lb/A	4	6.0 lb/A	3	A maximum of four applications may be made with a minimum 7-day retreatment interval.
Bean, fresh and dried (*Phaseolus* species including snap, navy, and kidney), cowpea, lentil, pea, fresh and dried (*pisum* species), soybean						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	4	6.0 lb/A	3 (fresh beans) 14 (forage) 21 (dried beans, or hay)	A maximum of four applications may be made with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Beet, garden, roots, carrot, horseradish, radish, parsnip, rutabaga, salsify						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	6	6.0 lb/A	7	A maximum of six applications may be made with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	7	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Beet, garden, tops						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312]	2.0 lb/A	5	6.0 lb/A	14	A maximum of five applications may be made with a minimum 7-day retreatment interval.
Beet, sugar						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312]	2.0 lb/A	4	4.0 lb/A	28 (roots and forage)	A maximum of four applications may be made with a minimum 14-day retreatment interval.
	50% WP [264-314] 4 lb/gal FlC [264-321] [264-335]	1.5 lb/A	4	4.0 lb/A 3.0 lb/A (FlC)	28 (roots and forage)	A maximum of four applications may be made with a minimum 14-day retreatment interval.
	80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-333] [264-349]	1.5 lb/A	2	4.0 lb/A 3.0 lb/A (FlC)	28 (roots and forage)	A maximum of two applications may be made with a minimum 14-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Blueberry						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	10.0 lb/A	7	A maximum of five applications may be made with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	0.05 lb/1,000 sq. ft	4	NS	7	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, collards, kale, kohlrabi, mustard greens						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	4	6.0 lb/A	3 14 (Chinese Cabbage, collards, kale and mustard greens)	A maximum of four applications may be made with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	3 14 (Chinese Cabbage, collards, kale and mustard greens)	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.
Brussels sprouts (see broccoli)						
Cabbage (see broccoli)						

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Caneberry						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	10.0 lb/A	7	A maximum of five applications may be made with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	7	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.
Carrot (see beet, garden)						
Cauliflower (see broccoli)						
Celery, dandelion						

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	6.0 lb/A	14	A maximum of five applications may be made with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	14	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Cherry (see apricot)						
Chestnut (see almond)						
Chinese cabbage (see broccoli)						
Citrus fruits						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	7.5 lb/A	8	16.0 lb/A	5	A maximum of eight applications may be made with a minimum 14-day retreatment interval.
		16.0 lb/A	1	16.0 lb/A	5	Use limited to CA for control of California red scale and yellow scale.
Foliar application Ground	50% WP [CA83007] 80% WP [CA83007]	1.0 lb/100 gal	NS	NS	5	Use limited to CA. Applications may be made at 7-day retreatment intervals or as needed.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Citrus fruits (continued)						
Foliar application Ground or aerial	80% WP [FL890036] 4 lb/gal FlC [FL890037]	10.0 lb/A	NS	NS	5	Use limited to FL. Applications may be made as a dilute or concentrate spray using ground equipment or in a minimum of 10 gal/A by air. Applications may be made as needed.
Clover						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	1 per cutting	1.5 lb/A per cutting	7	

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Collards						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	4	6.0 lb/A 6.1 lb/A for the 2 and 4 lb/gal FlC (EPA Reg. Nos. 264-334 and 264-335)	14	See "Broccoli."
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	14	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Corn, field and pop						
Broadcast foliar, banded Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	4	8.0 lb/A	14 (forage and silage) 48 (grain and fodder)	A maximum of four applications may be made with a minimum 14-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Corn, sweet						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	8	16.0 lb/A	2 (ears) 14 (forage) 48 (fodder)	A maximum of eight applications may be made with a minimum 3-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	2	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Cotton						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312]	1.5 lb/A	4	6.0 lb/A	14 (forage) 28 (seed)	A maximum of four applications may be made with a minimum 7-day retreatment interval.
Band and/or directed spray Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	4	6.0 lb/A	14 (forage) 28 (seed)	

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Cowpea (see bean)						
Cranberry						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	10.0 lb/A	7	See "Blueberry."

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Cucumber, melon, pumpkin, squash						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.0 lb/A	6	6.0 lb/A	3	A maximum of six applications may be made with a minimum 7-day retreatment interval. P/T formulations not used on pumpkins

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Dandelion (see celery)						
Eggplant (see tomato)						
Endive (see lettuce)						
Filbert (see almond)						
Flax						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	2	3.0 lb/A	42 (seed and straw)	Use prohibited in CA. A maximum of two applications may be made with a minimum 14-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Grape						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	10.0 lb/A	7	See "Blueberry."
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	7	See "Blueberry."

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Grasses (grown for seed)						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	2	3.0 lb/A	14	A maximum of two applications may be made with a minimum 14-day retreatment interval.
Horseradish (see beet, garden)						
Kale (see broccoli)						
Kohlrabi (see broccoli)						

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Lentil (see bean)						
Lettuce, head and leaf; endive						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	6.0 lb/A	14	See "Beet, garden, top" or "Celery."
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	14	See "Celery."

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Melon (see cucumber)						
Millet, proso						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	2	3.0 lb/A	7 (forage) 21 (grain and straw)	A maximum of two applications may be made with a minimum 14-day retreatment interval. Use of the 50%, 80%, and 85% WP (EPA Reg. Nos. 264-314, 264-315, 264-316, and 264-526) and the 4 lb/gal FlC (EPA Reg. Nos. 264-321, 264-333, 264-335, and 264-349) formulations is prohibited in CA.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Mustard greens						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	4	6.0 lb/A 6.1 lb/A for the 2 and 4 lb/gal FlC (EPA Reg. Nos. 264-334 and 264-335)	14	See "Broccoli."
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	14	A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Nectarine (see apricot)						
Olive						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	7.5 lb/A	2	15.0 lb/A	14	A maximum of two applications may be made with a minimum 14-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Parsley (see lettuce)						
Parsnip (see beet, garden)						
Pastures						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	2	3.0 lb/A	14	A maximum of two applications may be made with a minimum 14-day retreatment interval.
Cereal grain bait application Ground or aerial	4 lb/gal FlC [264-333]	0.5 lb/A	1	NS	0	

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Peach (see apricot)						
Peanut						
Broadcast foliar, banded Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312]	1.0 lb/A	5	8.0 lb/A	14	A maximum of five applications may be made with a minimum 7-day retreatment interval.
	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	8.0 lb/A	14	A maximum of five applications may be made with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	14	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Pea (see bean)						
Pea, fresh and dried (*Pisum* species) and Southern pea (see bean)						
Pecan (see almond)						
Pepper (see tomato)						
Pistachio						
Dormant/delayed dormant and foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	5.0 lb/A	4	15.0 lb/A	14	A maximum of four applications may be made (including dormant/delayed dormant applications) with a minimum 7-day retreatment interval. Dormant/delayed dormant applications may be made in combination with dormant oil.
Foliar application Aerial	80% WP [CA810059]	6.0 lb/A	1	NS	14	Use limited to CA. Application may be made in a minimum of 20 gal/A.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Plum/Prune (see apricot)						
Pome fruits (including apples, pears, loquats, crabapples, oriental pears, and quince)						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	3.0 lb/A	8	15.0 lb/A	3	A maximum of eight applications may be made (including thinning sprays on apples) with a minimum 14-day retreatment interval. Application of the 80% WP (EPA Reg. Nos. 264-316 and 264-526) and 4 lb/gal FlC (EPA Reg. Nos. 264-333, 264-335, and 264-349) formulations to quince are prohibited.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Pome fruits (including apples, pears, loquats, crabapples, oriental pears, and quince)(continued)						
Postbloom (for fruit thinning) Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	3.0 lb/A	8	15.0 lb/A	3	Use limited to apples. A maximum of eight applications may be made (including thinning sprays on apples) with a minimum 14-day retreatment interval.
Postbloom (for fruit thinning) Ground	4 lb/gal FlC [NC960003] [OH960003] [OR950006] [PA960002] [VA950001] [WA940021]	3.0 lb/A	NS	6.0 lb/A for NC960003	NS	Use limited to NC, OH, OR, PA, VA, and WA. Applications may be made after 80 to 100% petal fall and 9 mm fruit size.
Postbloom (for fruit thinning) Ground	50% WP [NC820007]	1.0 lb/100 gal (dilute) [250-600 gal finished spray/A]	NS	NS	NS	Tank mix use with plant regulator ethephon limited to NC.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Pome fruits (including apples, pears, loquats, crabapples, oriental pears, and quince)(continued)						
Foliar application Ground	50% WP [CA83007] 80% WP [CA83007]	1.0 lb/100 gal	5 (for loquats)	NS	1 (for apples and pears) 5 (for loquats)	Use limited to CA. Applications may be made at 7-day retreatment intervals or as needed.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Potato						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	6	6.0 lb/A	7	See "Beet, garden, roots."

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Potato (continued)						
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	7	See "Beet, garden, roots."
Pumpkin (see cucumber)						
Radish (see beet, garden)						

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Rangeland						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349] 3.2 lb/gal RTU [264-427] [3] 4 lb/gal RTU [264-422]	1.0 lb/A	1	1.0 lb/A	0	A maximum of one application may be made per year.
Cereal grain bait application Ground or aerial	4 lb/gal FlC [264-333] 4 lb/gal RTU [264-422]	0.5 lb/A	1	NS	0	
Rhubarb						

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	14	See "Celery."

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Rice						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	2	4.0 lb/A	14 (grain and straw)	A maximum of two applications may be made with a minimum 7-day retreatment interval. CA only: for control of tadpole shrimp; max number applications and RTI not specified.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Rutabaga (see beet, garden)						
Salsify (see beet, garden)						
Sorghum, grain						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	4	6.0 lb/A	21 (grain and fodder) 14 (forage and silage)	A maximum of four applications may be made with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Soybean (see bean)						
Spinach (see lettuce)						
Squash (see cucumber)						
Strawberry						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	5	10.0 lb/A	7	A maximum of five applications may be made with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Strawberry (continued)						
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	7	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.
Sunflower						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	2	3.0 lb/A	30 (forage) 60 (seed)	Use in CA is prohibited. A maximum of two applications may be made with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Sweet potato						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	8	8.0 lb/A	7	A maximum of eight applications may be made with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Sweet potato (continued)						
Dip treatment Preplant	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	8.0 lb/100 gal	NS	1.2 lb/A	NA	
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.3 lb/A	4	NS	7	Use prohibited in CA. A maximum of four applications may be made per year with a minimum 7-day retreatment interval.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Swiss chard (see lettuce)						
Tobacco						
Broadcast foliar (plant bed and field) Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	4	8.0 lb/A	0	A maximum of four applications may be made with a minimum 7-day retreatment interval. Applications may be made in a minimum of 10 gal of finished spray/A.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Tomato, pepper, eggplant						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 2 lb/gal FlC [264-334] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	2.0 lb/A	7	8.0 lb/A	3	A maximum of seven applications may be made with a minimum 7-day retreatment interval.
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	3	Use prohibited in CA. A maximum of 4 applications may be made per year with a minimum 7-day RTI.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Trefoil, birdsfoot						
Broadcast foliar Ground or aerial	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	1 per cutting	1.5 lb/A per cutting	7	
Turnip, roots						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312]	2.0 lb/A	6	6.0 lb/A	7	See "Beet, garden, roots."
Soil broadcast Before, during, or after the growing season Ground	7% G [264-429] [264-430]	2.2 lb/A	4	NS	7	See "Beet, garden, root."

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Turnip, tops						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312]	2.0 lb/A	5	6.0 lb/A	14	See "Beet, garden, top."
Walnut (see almond)						
Wheat						
Broadcast foliar Ground or aerial	5% P/T [264-320] 10.04% P/T [264-312] 50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	1.5 lb/A	2	3.0 lb/A	7 (forage) 21 (grain and straw)	A maximum of two applications may be made with a minimum 14-day retreatment interval. Use of the 50%, 80%, and 85% WP (EPA Reg. Nos. 264-314, 264-315, 264-316, and 264-526) and 4 lb/gal FlC (EPA Reg. Nos. 264-321, 264-333, 264-335, and 264-349) formulations is prohibited in CA.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Livestock Uses						
Poultry treatment (chickens, ducks, geese, game birds, pigeons, and turkeys)						
Direct animal treatment Electric fog machine	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-349]	5 oz/1 gal [1.5 gal finished spray per 1,000 hens]	NS	NS	7-day pre-slaughter interval	Applications may be repeated in 4 weeks if necessary.
Direct animal treatment Compressed air sprayer	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-333] [264-335] [264-349]	3.2 oz/5 gal [1 gal finished spray per 100 hens]	NS	NS	7-day pre-slaughter interval	Applications may be repeated in 4 weeks if necessary.

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Poultry houses (chickens, ducks, geese, gamebirds, pigeons, and turkeys)						
Premise treatment Spreader or sprayer	5% P/T [264-320] 10.04% P/T [264-312]	2.4 oz/1,000 sq. ft	NS	NS	NA	Applications may be made uniformly to the floor or litter area. A 7-day preslaughter interval (PSI) has been established for poultry, game birds and their premises.
	50% WP [264-314] 80% WP [264-316] [264-526] 85% WP [264-315] 4 lb/gal FlC [264-321] [264-335] [246-349]	4-50 lb/100 gal [1-2 gal of spray mixture per 1,000 sq. ft]	NS	NS	NA	Applications may be made to the wall, litter, or roost area. A 7-day PSI has been established for birds and their premises.
Premise treatment Sprayer or duster	80% WP [264-316] [264-526]	1.0 lb/1,000 sq. ft	NS	NS	NA	Applications may be made as a dilute spray or as a dry dust to floor surface, walls, cracks, posts, and crevices. A 7-day PSI has been established for birds and their premises.
	4 lb/gal FlC [264-333] [264-335] [264-349]	0.54-0.55 lb/1,000 sq. ft	NS	NS	NA	

(continued; footnotes follow)

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Directions and Limitations [2]
Fish and Shellfish Uses						
Oyster beds						
Application to dewatered oyster beds Ground or aerial	80% WP [WA900013]	10.0 lb/A	NS	NS	365	Application is for control of ghost shrimp and mud shrimp. Application must be made and completed within 30 minutes after low tide to prevent direct contamination of water. Use is limited to areas greater than 200 feet from channels and sloughs. For aerial application, a 200-foot buffer zone is required between the treatment area and the nearest shellfish to be harvested. A 50-foot buffer zone is required if treatment is by hand spray. Treatment is allowed only on ground with no oysters within one year of harvest are present.

[1] The following labels list a drench spot application to fire ant mounds in rangeland or pastures: Epa Reg. Nos. 264-314, -315, -316, -321, -349, and -526. EPA Reg. Nos. 264-334 and -335 permit drench spot treatment for fire ants on all labeled crops/sites. The labeled rate for fire ant spot treatment is 6.7-10.6 g/gal. Granular spot treatment with EPA Reg. Nos. 264-429 and -430 may also be made at 6g/ant mound.

[2] A restriction against planting rotational food and feed crops not listed on the label or other carbaryl labels in carbaryl treated soil is specified on the labels for the following products: EPA Reg. Nos. 264-312, 264-314, 264-315, 264-316, 264-320, 264-321, 264-333, 264-334, 264-335, 264-349, 264-422, 264-427, 264-429, and 264-526.

Irrigation restrictions: (i) Use in irrigation systems prohibited for EPA Reg. No. 264-422, -427; (ii) use of reclaimed irrigation water on upland crops for which no carbaryl tolerances established prohibited for EPA Reg. Nos. 264-312, -314, -315, -320, -321, -333, -334, -335, -349, -422, -427; (iii) may be applied through sprinkler irrigation systems including center pivot and solid set - use of all other types prohibited EPA Reg. Nos. 264-312, -314, -315, -316, -321, -333, -349, -526).

12-Hour RTI for EPA Reg. Nos. 264-312, -314, -315, -316, -320, -321, -333, -335, -349, -422, -427, -526).

[3] The 3.2 lb/gal RTU (EPA Reg. No. 264-427) product label lists the application rates in quarts of product per acre for non cropland and rangeland; however, to make this product label consistent with the other products the application rates should be expressed as fluid ounces per acre.

Table B. Residue Chemistry Science Assessments for Reregistration of Carbaryl.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
860.1200: Directions for Use	N/A = Not Applicable	Yes [3]	
860.1300: Plant Metabolism	N/A	No	**00049135 00053897 00116083 00118342 00124353 00124968 00125170** 43249101[4] 43249102[4] 43249103[4]
860.1300: Livestock Metabolism	N/A	No[5]	**00015669 00053897 00080417 00080679 00080680 00080681 00080682 00080683 00080686 00080689 00080690 00091952 00095927 00118346 00118347 00118365 00118368 00118371 00118375 00118376 00118377 00139664** 43324601[6,7]
860.1340: Residue Analytical Methods			
-Plant commodities	N/A	Yes [8]	**00080417 00080680 00098504 00107017 00118342 00118346 00118366 00118367 00118368 00118370 00118372 00118373 00118377 00124334 00124361 00145884 00147760 00154626 00156736 00159326 05001852 05004154 05004934 05008728 05010424 05014156 05014889 05016141 05018884 05019959 40255702 40408601** 43672701[9] 43672702[9] 43786805[10] 44155401[11]
-Livestock commodities	N/A	Yes [12]	**00061103 00080417 00080680 00118346 00118366 00118367 00118368 00118370 00118372 00118373 00118375 00118376 05001852 05004154 05008728 05010424 05014156 05014889 05016141 05018884 05019959** 44286901[13] 44286902[13] 44286903[13]
860.1360: Multiresidue Methods	N/A	No	
860.1380: Storage Stability Data			
-Plant commodities	N/A	Yes[14]	**00163007 00163009 00163014 40408601** 43850902[15] 44068401[16] 44123101[17] 44250301[16] 44412501[18]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
-Livestock commodities	N/A	No	44250901[13] 44381901[13]
860.1500: Crop Field Trials			
Root and Tuber Vegetables Group			
-Beet, garden, roots	5 [§180.169(a)]	No	**00089868** 43813601[10]
-Beet, sugar, roots	None established	No	**00089868 00163007** 40376001[19] 40376002[20]
-Carrot	10 [§180.169(a)]	No	**00090325** 43813601[10]
-Horseradish	5 [§180.169(a)]	No	**00089868** 43813601[10]
-Parsnips	5 [§180.169(a)]	No	**00089868** 43813601[10]
-Potato	0.2 [§180.169(a)]	No	**00107017 00134421** 40512501[20]
-Radishes	5 [§180.169(a)]	No	**00089868** 43813601[10]
-Salsify, roots	5 [§180.169(a)]	No	**00089868** 43813601[10]
-Turnip, roots	5 [§180.169(a)]	No	**00089868** 43813601[10]
-Sweet potato	0.2 [§180.169(a)]	No	**00107017** 43702002[21]
Leaves of Root and Tuber Vegetables Group			
-Beet, garden, tops	12 [§180.169(a)]	No	**00089868** 43813601[10]
-Beet, sugar, tops	100 [§180.169(a)]	No[19]	**00089868**
-Salsify, tops	10 [§180.169(a)]	No	**00089868** 43813601[10]
-Turnip, tops	12 [§180.169(a)]	No	**00089868** 43813601[10]
Leafy Vegetables (except *Brassica)* Vegetables Group			
-Celery	10 [§180.169(a)]	No	**00124337** 43677401[22]
-Dandelions	12 [§180.169(a)]	No[22]	**00089868** 43677401[22]
-Endive	10 [§180.169(a)]	No[23]	**00089868** 43677401[22]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
-Lettuce	10 [§180.169(a)]	No	**00089868 00090162** 43677401[22]
-Parsley	12 [§180.169(a)]	No[23]	**00089868** 43677401[22]
-Spinach	12 [§180.169(a)]	No	**00089868** 43677401[22,24]
-Swiss chard	12 [§180.169(a)]	No	**00089868** 43677401[22]
<u>*Brassica* (Cole) Vegetables Group</u>			
-Broccoli	10 [§180.169(a)]	No	**00090325** 43721001[22] 44019701[25]
-Brussels sprouts	10 [§180.169(a)]	No[26]	**00090325** 43721001[22]
-Cabbage	10 [§180.169(a)]	No	**00090325** 43786806[10]
- Cauliflower	10 [§180.169(a)]	No[27]	**00090325** 43721001[22]
- Chinese cabbage	10 [§180.169(a)]	No	**00089868** 43794903[10]
- Collards	12 [§180.169(a)]	No	**00089868** 43794903[10]
- Kale	12 [§180.169(a)]	No	**00089868** 43794903[10]
- Kohlrabi	10 [§180.169(a)]	No[27]	**00090325** 43721001[22]
-Mustard greens	12 [§180.169(a)]	No	**00089868** 43794903[10]
<u>Legume Vegetables Group</u>			
-Bean, fresh and dried	10 [§180.169(a)]	No	**00089679 00089680 00089681 00082424 00089837 00090113 00163014 00124334** 43786804[10] 43984701[27]
-Cowpeas	5 [§180.169(a)]	No	**00089837** 43694103[22]
-Lentils	10 [§180.169(a)]	No	**00089837 00124334** 43694103[22]
-Peas (with pods)	10 [§180.169(a)]	No	**00090113 00124334** 43703102[22]
-Soybeans	5 [§180.169(a)]	No	**00089837** 43694102[22]
<u>Foliage of Legume Vegetables Group</u>			

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
-Bean, forage and hay	100, forage 100, hay [§180.169(a)]	No[28]	**00082424 00089679 00089680 00089681 00089837 00125090**
-Cowpea, forage and hay	100, forage 100, hay [§180.169(a)]	No	**00089837** 43786804[10]
-Pea, vines	100 [§180.169(a)]	No	**00089837 00124334** 43786804[10]
-Soybean, forage and hay	100, forage 100, hay [§180.169(a)]	No	**00089837** 43694102[22]
Fruiting Vegetables (Except Cucurbits) Group			
-Eggplant	10 [§180.169(a)]	No	**00089600** 43686701[22] 43996101[28]
-Pepper	10 [§180.169(a)]	No	**00089600** 43686701[22]
-Tomato	10 [§180.169(a)]	No	**00089600** *00159326* 43996101[28]
Cucurbit Vegetables Group			
-Cucumber	10 [§180.169(a)]	No	**00089376** 43786802[10]
-Melon	10 [§180.169(a)]	No	**00090325** 43786802[10]
-Pumpkin	10 [§180.169(a)]	No	**00090325** 43786802[10]
-Squash, summer	10 [§180.169(a)]	No	**00089376** 43786802[10]
-Squash, winter	10 [§180.169(a)]	No	**00090325** 43786802[10]
Citrus Fruits Group			
-Citrus	10 [§180.169(a)]	No	**00090204 00090320** *00163008* 43802101[15] 44211801[29]
Pome Fruits Group			
-Pome fruits	10 [§180.169(d)]	No	**00080419 00082420 00082423 00083311 00083312 00089455 00089679 00089680** *00159327* 44072901[11]
Stone Fruits Group			
-Apricot	10 [§180.169(a)]	No	**00090160** 43793202[15] 44284701[30]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
-Cherry	10 [§180.169(a)]	No	**00089348 00124345** 43793202[15] 44284701[30]
-Nectarine	10 [§180.169(a)]	No	**00090160**[30] 43793202[15] 44284701
-Peach	10 [§180.169(a)]	No	**00082422**[30] 43793202[15] 44284701
-Plum (fresh prune)	10 [§180.169(a)]	No	**00089348 00124345** 43793202[15] 44284701[30]
Berries Group			
-Blackberry	12 [§180.169(a)]	No	**00089868** 43698201[22]
-Blueberry	10 [§180.169(a)]	No	**00090161** 43694101[22]
-Boysenberry	12 [§180.169(a)]	No	**00089868** 43698201[22]
-Dewberry	12 [§180.169(a)]	No	**00089868** 43698201[22]
-Loganberry	12 [§180.169(a)]	No	**00089868** 43698201[22]
-Raspberry	12 [§180.169(a)]	No	**00089868** 43698201[22]
Tree Nuts Group			
-Almond, nutmeat and hulls	1, almonds; 40, almonds, hulls [§180.169(a)]	No	**00108985 00140447** 43786801[15]
-Chestnut	1 [§180.169(a)]	No	43786801[15] 43802102[15]
-Filbert	1 [§180.169(a)]	No	**00090156** 43786801[15] 43802102[15]
-Pecan	1 [§180.169(a)]	No	**00123219** 43802102[15]
-Walnut	1 [§180.169(a)]	No	**00108985 00140447** 43818901[15]
Cereal Grains Group			
-Barley, grain	0 [§180.169(a)]	No[30]	
-Corn, field and pop	5, fresh (including sweet) K+CWHR [§180.169(a)]	No	**00089420 00125090 00125107** *00163009* 44058001[16]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
-Corn, sweet	5, fresh (including sweet) K+CWHR [§180.169(a)]	No	**00089378 00089420 00125090 00125107** 44058101[11]
-Millet, proso, grain	3 [§180.169(a)]	No[31]	**00074368** 43975601[15]
-Oats, grain	0 [§180.169(a)]	No[30]	
-Rice, grain	5 [§180.169(a)]	No	**00089837 00125138** 43802103[15]
-Rye, grain	0 [§180.169(a)]	No[30]	
-Sorghum, grain	10 [§180.169(a)]	No	43794901[10]
-Wheat, grain	3 [§180.169(a)]	No	**00015669 00115284 00136415** 41594301[32] 43975601[15]
Forage, Fodder, and Straw of Cereal Grains Group			
-Barley, forage and straw	100, green fodder 100, straw [§180.169(a)]	No[30]	
-Corn, fodder and forage	100, fodder 100, forage [§180.169(a)]	No	**00089378 00089420 00125090 00125107** 44058001[33] 44058101[11]
-Millet, proso, straw	100 [§180.169(a)]	No[31]	**00074368** 43975601[15]
-Oats, forage and straw	100, green fodder 100, straw [§180.169(a)]	No[30]	
-Rice, straw	100, straw [§180.169(a)]	No	**00089837 00125138** 43802103[15]
-Rye, forage	100, green fodder 100, straw [§180.169(a)]	No[30]	
-Sorghum, forage	100, forage [§180.169(a)]	No	*00159329* 43794901[10]
-Wheat, forage and straw	100, green fodder 100, straw [§180.169(a)]	Yes[34]	**00015669 00115284 00136415**
Grass Forage, Fodder, and Hay Group			
-Pastures	100, grass; 100, hay [§180.169(a)]	Yes[35]	**00089837 00125121 00125123 00125555** *00163006* 43716601[22]
-Rangeland	100, grass; 100, hay [§180.169(a)]	No	**00089837 00125121 00125123 00125555** *00163006* 44065901[34]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
Non-grass Livestock Feeds (Forage, Fodder, Straw, and Hay) Group			
-Alfalfa, forage and hay	100, fresh; 100, hay [§180.169(a)]	No	**00089837 00125121 00125123** *00159325*
-Birdsfoot trefoil, forage and hay	100, fresh; 100, hay [§180.169(a)]	No	**00089837 00125121 00125123** *00159325*
-Clover, forage and hay	100, fresh; 100, hay [§180.169(a)]	No	**00089837 00125121 00125123** 43694105[22]
Herbs and Spices Group			
-Dill, fresh	0.2 [§180.169(e)]	No	PP#7E3543[36]
Miscellaneous Commodities			
-Aspirated grain fractions	None	No[37]	43794902[10] 43813602[10]
-Asparagus	10 [§180.169(a)]	No	**00083527 00140449** 43654201[10]
-Avocado	10 [§180.169(e)]	No[30]	
-Banana	10 [§180.169(a)]	No	44798401[39]
-Cranberry	10 [§180.169(a)]	No	**00090161** 43697604[22]
-Cotton, seed and forage	5, cottonseed 100, cotton forage [§180.169(a)]	No (Revoke)[38]	**00089837 00124343 00125099 40881307**
-Flax, seed and straw	5, seed; 100, straw [§180.169(a)]	No	**00074366 00074367** 43982801[15]
-Grapes	10 [§180.169(a)]	No	**00089418 00089458 00125084** 43793201[15]
-Maple, sap	0.5 [§180.169(a)]	No[30]	
-Okra	10 [§180.169(a)]	No	**00090229** 44123101[17]
-Olives	10 [§180.169(a)]	No[40]	**00090281** 43702001[22] 44321301[18]
-Peanuts, nut and hay	5, peanut; 100, hay [§180.169(a)]	No	**00089837** 43703101[22]
-Pineapple	2.0 [§180.169(d)]	Yes[39]	PP#5F3208
-Pistachio nuts	1 [§180.169(a)]	No	**00124335** 43703103[22]
-Prickly pear cactus	12, fruit; 12, pads [§180.169(a)]	No	*00103288* 44145201[17]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
-Strawberry	10 [§180.169(a)]	No	**00089348** 43698202[22]
-Sunflower	1, seeds [§180.169(a)]	No	**00058927 00058928** 43786803[10]
-Tobacco	None established	No	44114301[40]
860.1520: Processed Food/Feed			
-Beet, sugar	None established	No	*00163017*
-Citrus fruits	None established	No	43694104[22]
-Corn, field	None established	No	*00163018* 43915201[15]
-Cottonseed	None established	No	43850901[15]
-Flaxseed	None established	No	**00074366 00074367**
-Grapes	None established	No	*00163010 00163011* 43697601[22] 43697602[22]
-Olives	None established	No	43698203[22]
-Peanut	None established	No	*00163012* 44046101[26]
-Pineapple	20, bran [§186.550]	No	PP#5F3208[41]
-Plum	None established	No	*00159328*
-Pome fruits	None established	No	43702003[22]
-Potato	None established	No	**00159324** 43697603[22]
-Rice	None established	No	*00163013* 43813603[10]
-Sorghum	None established	No	*00163015* 43813604[10]
-Soybean	None established	No	*00163016* 43794902[10]
-Sunflower	None established	No	43845205[15]
-Tomato	None established	No	43686702[22]
-Wheat	None established	No	43813602[10]
860.1480: Meat, Milk, Poultry, Eggs			
-Milk and the Fat, Meat, and Meat Byproducts of Cattle, Goats, Hogs, Horses, and Sheep	0.1, fat, meat, and meat byproducts; 1, kidney and liver [§180.169(b)]	No	**00015669** *00061106* **00080417 00080419 00080420** *00089380 00089836 00089837* **00118342 00118346 00118367 00118368 00118370 00118372 00118373 00118374 00118378 40881302 40881312 40881313 40881314** 44250901[13] 44381901[13]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
-Fat, Meat, and Meat Byproducts of Poultry	5.0 Fat and meat [§180.169(b)]	No	**00061103 00080420 00080680 00118375 00118376** *00124367 00125571 00135678 00135680* **40881308 40881309**
-Eggs	0.5 [§180.319]	No	

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?[1]	References [2]
860.1400: Water, Fish, and Irrigated. Crops			
-Oysters	0.25 [§180.169(a)]	No	PP#1E2554[42]
860.1460: Food Handling Establishments	N/A	N/A	
860.1850: Confined Rotational Crops	N/A	No	43651701 [43]
860.1900: Field Rotational Crops	None established	No	

1. Reassessed tolerances for leafy vegetables remain tentative until granular data required to support the reregistration of carbaryl are submitted. The registrant should conduct one side-by-side trial comparing a granular formulation and a spray formulation. If the residues resulting from use of the granular formulation for all crops are the same or less than the spray formulation, then no additional granular data would be required.

2. **Bolded** references were reviewed in the Residue Chemistry Chapter of the Carbaryl Reregistration Standard dated 3/15/83 or the Interim Residue Chemistry Chapter of the Carbaryl Reregistration Standard dated 3/30/84. *Italicized* references were reviewed in the Residue Chemistry Chapter of the Carbaryl (FRSTR) Reregistration Standard dated 5/3/88. All other references were reviewed as noted.

3. Label revisions are required for several crops in order to reflect the parameters of use patterns for which residue data are available. Details of the required label amendments are presented in the Directions for Use section.

4. DP Barcode D204197, 11/28/95, S. Hummel.

5. No tolerances are needed for residues of carbaryl in/on poultry; the presently registered uses of carbaryl are classified as Category 3 of 40 CFR §180.6(a) with respect to the need for tolerances in poultry and eggs i.e., there is no reasonable expectation of finite residues.

6. CB No. 14249, DP Barcode D206777, 11/28/95, S. Hummel.

7. DP Barcode D255855, C. Olinger, 5/16/99 and 6/17/99.

8. The proposed HPLC enforcement method for carbaryl *per se* in plants (Method CACR-0194) should be submitted to the Agency for validation.

9. DP Barcode D216544, S. Hummel, 1/22/96.

10. DP Barcodes D216242, D219527, D219596, and D220287, T. Morton, 9/17/98.

11. DP Barcodes D230246, D230406, and D231533, M. Perry, 5/26/98.

12. HPLC Method Aventis File No. 45186, which has successfully undergone an ILV should be submitted to the Agency for validation

13. DP Barcodes D236574, D236421, and D240469, C. Olinger, 12/15/99.

Table B *(continued)*.

14. Additional data are required depicting the storage stability of carbaryl *per se* in processed commodities of an oily crop for up to 10 months. The maximum storage interval for processed commodities of an oily crop was ~10 months (soybean processed commodities).

    In addition, the registrant is relying on earlier magnitude of the residue studies which are not supported by the existing storage stability data. Unless the registrant can demonstrate that samples from studies reflecting the use patterns the registrant wishes to support were not stored longer than 12 months, additional storage stability data are required. The required data must reflect storage intervals of 18 months for alfalfa commodities, 15 months for potatoes, 22 months for wheat commodities, and 33 months for rangeland grass. In addition, if the registrant wishes to rely on the previously submitted sugar beet processing study, information pertaining to sample conditions and intervals for the study must be submitted.

15. DP Barcodes D218865, D219999, D220949, D221158, D223008, D219971, D220601, D220948, D221313, D225204, and D225576, F. Suhre, 9/13/96.

16. DP Barcodes D228656 and D235113, C. Olinger, 11/09/99.

17. DP Barcodes D230900 and D231134, M. Perry, 5/22/98

18. DP Barcode D240998 and D237653, C. Olinger, 4/9/98.

19. CB No.: 3027, DP Barcode: none, M. Nelson, 3/28/88.

20. CB No.: 3510, DP Barcode: none, M. Kovacs, 4/25/88.

21. DP Barcodes D217179, D217172, D217177, D217631, D217704, and D217705, F. Suhre, 10/7/96.

22. Data for spinach will be translated to dandelion and parsley.

23. Data on lettuce will translate to endive.

24. DP Barcode D234692, C. Olinger, 9/11/97.

25. DP Barcodes D227765 and D227009, M. Perry, 5/12/98.

26. Data on broccoli will be translated to Brussels sprouts, cauliflower, and kohlrabi.

27. DP Barcodes D225659 and D226582, F. Suhre, 8/21/96.

28. Data are no longer required as cowpea is the only bean crop considered for livestock feeding.

29. DP Barcodes D236422 and D236485, C. Olinger, 11/9/99.

30. The registrant does not intend to support carbaryl uses on avocados, barley, maple trees, oats, rye, and sweet sorghum; however, IR-4 has indicated (Correspondence from K. Dorschner, IR-4 Project, 9/15/94) that they may submit residue data to support reregistration for some of these commodities. These data have not been submitted.

31. Acceptable residue data on wheat will be translated to support the use on proso millet.

32. CB No. 6972, H. Fonouni, 10/5/90.

33. DP Barcodes D228260 and D228652, C. Olinger, 11/9/99.

34. Adequate data are available to reassess the tolerance for wheat forage and straw. However, the Agency now considers wheat hay a significant livestock feed item (OPPTS GLN 860.1000 Table 1.). A full set of 20 field trials as specified in OPPTS GLN 860.1500 are required depicting carbaryl residues in/on wheat hay. When all the field trials are complete, PHIs and tolerances for hay based on the field trial data should be proposed. Data on wheat hay will be translatable to proso millet hay.

Table B *(continued)*.

35. Data are required depicting residues of carbaryl in/on grass forage harvested immediately (0-day) following the last of two applications of carbaryl (WP or FlC) at 1.5 lb ai/A to pasture. A total of 12 field trials are required in areas throughout the U.S.

    The following data on grasses are available for risk assessment/reregistration purposes: Residue data from rangeland field trials support the current tolerance of 100 ppm in/on grass forage; as noted above, data are still needed on pasture grass forage before the tolerance can be reassessed . Data on pasture hay harvested at the 14-day PHI indicate that the tolerance on grass hay should be lowered to 15 ppm.

36. CB No. 3357, DP Barcode: none, M. Nelson, 2/25/88.

37. Based on available data, a tolerance of 70 ppm should be established for residues of carbaryl *per se* in/on aspirated grain fractions.

38. The use of carbaryl products on cotton has been cnaceled.

39. The registrant intends to support a tolerance for residues in/on imported pineapple. Five residue field trials must be submitted, three from Costa Rica and two from Mexico. DP Barcode D255348, 11/2000, C. Olinger.

40. DP Barcode D230407, T. Morton, 9/29/98.

41. DP Barcode D215259, S. Hummel, 5/31/95.

42. Residues resulting from the registered use of carbaryl on oyster beds in WA are not likely to exceed the established tolerance (DP Barcode D204888, J Garbus, 8/5/94).

43. DP Barcode D215844, 9/10/98, C. Olinger.

TOLERANCE REASSESSMENT SUMMARY

The HED Metabolism Committee has concluded that the U.S. tolerance expression for plant commodities should be amended to include only carbaryl *per se* (S. Hummel, 2/8/96). Accordingly, the tolerance definition for carbaryl should be amended to include only parent carbaryl. The tolerance expression for livestock commodities should be amended to include free and conjugated residues of carbaryl, 5,6-dihydro-5,6-dihydroxy carbaryl, and 5-methoxy-6-hydroxy carbaryl. In addition, the tolerances listed separately under 40 CFR §180.169 (a through e) should be pooled into three listings, one for plant commodity tolerances with national registrations, one for livestock commodities, and the third for tolerances with regional registrations. The food additive tolerance for residues in pineapple bran should be revoked as this is no longer a regulated commodity (40 CFR §186.550). Some analytical methods determine the combined residue of carbaryl and 1-naphthol. It should be noted that 1-napthol is a very minor part of the residue; therefore, the plant commodity tolerances, which are based on carbaryl only, are not greatly exaggerated.

A summary of carbaryl tolerance reassessments and recommended modifications in commodity definitions are presented in Table C.

Tolerances Listed Under 40 CFR §180.169(a), (b), (c), (d), and (e):

As noted above, conclusions pertaining to leafy vegetables crops which retain post-emergence granular uses are *tentative* pending submission of bridging residue data reflecting use of a representative G formulation or revision of the labels for the G formulations. In addition, supporting storage stability data are still required for several crop commodities.

Aventis has proposed and/or the available data support the establishment of tolerances for residues in/on the following crop groups and subgroups: Brassica leafy greens; bushberry; caneberry; cucurbit vegetables; dried, shelled pea and bean (except soybean); edible-podded legume vegetables; foliage of legume vegetables except soybeans; fruiting vegetables (excluding cucurbits); leaf petioles; leaves of root and tuber vegetables (excluding sugar beet); root and tuber vegetables (excluding sugar beet roots and sweet potatoes); stone fruits; and tree nuts (excluding walnuts). As a result, separate tolerances on many commodities need to be revoked concomitant with establishing tolerances for the appropriate crop group and subgroup. The recommended changes are summarized in Table C under "Tolerances Needed Under 40 CFR §180.169(a), crop group/subgroup tolerances."

Residue data are required on pasture grass forage before the tolerance for residues in/on grass forage can be reassessed.

Additional data are required on pineapple before the tolerance can be reassessed. Five trials must be submitted, three from Costa Rica and two from Mexico.

The registrant is not supporting carbaryl uses on avocados, barley, maple sap, oats, and rye, and with the exception of avocados, these uses have been removed from the labels. IR-4 has indicated (Correspondence from K. Dorschner, IR-4 Project, 9/15/94) that they may be willing to submit residue data for some of these commodities; however, data have not been submitted.

The tolerances for bean forage and hay should be revoked because they are no longer considered significant livestock feed items.

Data from a ruminant feeding study were used as the basis for reassessing tolerances for residues in livestock commodities. For tolerances on commodities of cattle, goats, horses and sheep, the available data support the current tolerances of 0.1 ppm for residues of carbaryl in meat, but indicate that the tolerances for fat are too low and should be increased to 0.2 ppm; the established tolerance for residues in milk should be lowered to 0.1 ppm. Separate tolerances for residues in kidney and liver (1.0 ppm) and meat byproducts excluding kidney and liver (0.1 ppm) should be revoked, and a separate tolerance for residues in meat byproducts should be established at 3.0 ppm.

For swine commodities, the available data indicate the established tolerances for carbaryl residues in hog meat and fat (0.1 ppm) are too high and should be set at 0.02 ppm (the method limit of quantitation). Separate tolerances for residues in hog kidney and liver (1.0 ppm each) and meat byproducts excluding kidney and liver (0.1 ppm) should be revoked, and a separate tolerance for residues in hog meat byproducts established at 0.5 ppm.

The available residue data support the establishment of separate tolerances for residues in/on various crop groups and subgroups. As a result, separate tolerances on many commodities need to be revoked concomitant with establishing new tolerances for residues in/on the appropriate crop groups and subgroups. The recommended changes are summarized in Table C under "Tolerances Needed Under 40 CFR §180.169(a), crop group/subgroup tolerances."

New tolerances are also needed for carbaryl residues in/on the following RACs: aspirated grain fractions, proso millet hay, sorghum stover, sugar beet roots, and wheat hay. At the present time, sufficient data are only available to determine an appropriate tolerance for residues in/on aspirated grain fractions (70 ppm), sugar beet roots (0.5 ppm) and sorghum stover (30.0 ppm). Additional residue data are required before appropriate tolerances can be determined for residues in/on the remaining commodities; data on wheat hay will be translatable to proso millet hay.

Separate tolerances are also required for residues in the following processed food/feed items: wet apple pomace (15.0 ppm), citrus fruit oil (20.0 ppm), raisins (12.0 ppm), and rice hulls (30.0 ppm).

For livestock commodities, the residue data support establishing new tolerances for residues in meat byproducts of swine (0.5 ppm) and cattle, goats, and sheep (3.0 ppm); separate tolerances for residues in kidney and liver (1.0 ppm), and meat byproducts excluding kidney and liver (0.1 ppm) should be reassigned.

Table C. Tolerance Reassessment Summary for Carbaryl.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Tolerance Listed Under 40 CFR §180.169(a)			
Alfalfa	100.0	50.0	Residue data indicate that the tolerance should be lowered to 50.0 ppm.
Alfalfa, Hay	100.0	75.0	Residue data indicate that the tolerance should be lowered to 75.0 ppm.
Almonds	1.0	Reassign	Tolerance should be reassignd concomitant with establishing a 0.1 ppm tolerance on the *nuts, tree crop group (excluding walnuts)*.
Almond, hulls	40.0	50.0	Residue data indicate that the tolerance should be increased.
Apricots	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *fruit, stone crop group*.
Asparagus	10.0	15.0	Residue data indicate that the tolerance should be increased.
Banana	10.0	5	
Barley, fodder, green	100.0	Revoke	The registrant does not intend to support carbaryl uses on barley.
Barley, grain	0.0		
Barley, straw	100.0		
Beans	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance for *edible-podded legume vegetables* (crop subgroup 6A), and a 1.0 ppm tolerance for *dried, shelled pea and bean (except soybean)* (crop subgroup 6C).
Beans, forage	100.0	Revoke	Tolerance should be revoked. Bean forage and hay are no longer considered significant livestock feed items.
Beans, hay	100.0		
Beets, garden, roots	5.0	Reassign	Tolerance should be reassigned concomitant with establishing a 2.0 ppm tolerance on the *vegetables, root and tuber crop group (excluding sugar beets and sweet potatoes)*.
Beets, garden, tops	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 75.0 ppm tolerance on the *leaves of vegetables, root and tuber group (excluding sugar beets tops)*.
Beets, sugar, tops	100.0	25.0	The available data indicate that the tolerance should be lowered.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Blackberries	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 12.0 ppm tolerance on the *caneberry* crop subgroup.
Blueberries	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 3.0 ppm tolerance on the *bushberry* crop subgroup.
Boysenberries	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 12.0 ppm tolerance on the *caneberry* crop subgroup.
Broccoli	10.0	10.0	
Brussels sprouts	10.0	10.0	Data on broccoli will translate to Brussels sprouts.
Cabbage	10.0	21.0	The residue data indicate that the tolerance should be increased to 21.0 ppm.
Cabbage, chinese	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *vegetable,Brassica leafy group*.
Carrots	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetables, root and tuber group (excluding sugar beets and sweet potatoes)*.
Cauliflower	10.0	10.0	Data on broccoli will translate to cauliflower.
Celery	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 3.0 ppm tolerance on the *leaf petioles* crop subgroup.
Cherries	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *fruit, stone group* .
Chestnuts	1.0	Reassign	Tolerance should be reassignd concomitant with establishing a 0.1 ppm tolerance on the *nut, tree group (excluding walnuts)*.
Citrus fruits	10.0	10.0	Fruit, citrus, group
Clover	100.0	50.0	Residue data indicate that the tolerance should be lowered to 50.0 ppm.
Clover, hay	100.0	70.0	Residue data indicate that the tolerance should be lowered to 70.0 ppm.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Collards	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *vegetables, Brassica, leafy, group* .
Corn (inc. sweet) (K+CWHR)	5.0	0.10	*Corn, sweet (K+CWHR)*; residue data indicate that a separate tolerance on sweet corn (K+CWHR) should be established at 0.1 ppm.
		0.02	*Corn, grain, field and pop*; residue data indicate that a separate tolerance should be established for corn, grain at 0.02 ppm.
Corn, fodder	100.0	20.0	*Corn, stover (field and pop)*. Residue data indicate that the tolerance for field and pop corn stover should be lowered to 20.0 ppm.
		215.0	*Corn, sweet, stover.* Residue data indicate that the tolerance for sweet corn stover should be increased.
Corn, forage	100.0	30.0	*Corn, field, forage*. Residue data indicate that the tolerance for field corn forage should be lowered to 30.0 ppm.
		185.0	*Corn, sweet, forage.* Residue data indicate that the tolerance for field corn forage should be increased.
Cotton, forage	100.0	Revoke	No longer considered a significant feed item.
Cotton, seed	5.0	Revoke	The use on cotton has been cancelled.
Cranberries	10.0	3.0	Residue data indicate that the tolerance should be lowered to 3.0 ppm.
Cucumbers	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 3.0 ppm tolerance on the *vegetable, cucurbit, group.*
Dandelions	12.0	22.0	Residue data on spinach are translatable to dandelion. The residue data on spinach indicate that the tolerance must be increased.
Dewberry	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 12.0 ppm tolerance on the *caneberry* crop subgroup.
Eggplant	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 5.0 ppm tolerance on the *vegetables, fruiting, group (excluding cucurbits)*.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Endive (escarole)	10.0	10.0	Residue data on lettuce are translatable to endive.
Filberts (hazelnuts)	1.0	Reassign	Tolerance should be reassignd concomitant with establishing a 0.1 ppm tolerance on the *nuts, tree, group (excluding walnuts)*.
Flax, seed	5.0	0.50	Residue data support lowering the tolerance.
Flax, straw	100.0	Revoke	No longer considered a RAC of flax.
Grapes	10.0	10.0	
Grasses	100.0	TBD	*Grass, forage*. Residue data on rangeland grass forage harvested at a 0-day PGI support the current tolerance of 100 ppm; data on pasture grass forage harvested at 0-day PGI are needed.
Grasses, hay	100.0	15.0	Residue data on pasture hay indicate that the tolerance should be lowered to 15.0 ppm.
Horseradish	5.0	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetable, root and tuber, group (excluding sugar beets and sweet potatoes)*.
Kale	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the v*egetable, Brassica, leafy, group*.
Kohlrabi	10.0	10.0	Residue data on broccoli are translatable to kohlrabi.
Lentils	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 1.0 ppm tolerance on the *pea and bean, dried shelled, except soybean* group (6C).
Lettuce	10.0	10.0	
Loganberries	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 12.0 ppm tolerance on the *caneberry* crop subgroup.
Maple sap	0.50	Revoke	The registrant is not supporting this use
Melons	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 3.0 ppm tolerance on the *vegetable, cucurbit, group.*
Millet, proso, grain	3.0	1.0	Residue data for wheat grain indicate that the tolerance should be lowered to 1.0 ppm

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Millet, proso, straw	100.0	20.0	Adequate residue data on wheat straw are translatable to proso millet straw; the residue data support lowering the tolerance.
Mustard, greens	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *vegetable, Brassica, leafy, group*.
Nectarines	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *fruit, stone, group*.
Oats, fodder, green	100.0	Revoke	The registrant does not intend to support carbaryl uses on oats
Oats, grain	0.0		
Oats, straw	100.0		
Okra	10.0	4.0	The available data indicate that the tolerance should be lowered.
Olives	10.0	10.0	
Oysters	0.25	0.25	
Parsley	12.0	22.0	Residue data on spinach are translatable to parsley; the data indicate that the tolerance on parsley should be increased.
Parsnips	5.0	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetable, root and tuber, group (excluding sugar beets and sweet potatoes)*.
Peaches	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *fruit, stone, group*.
Peanuts	5.0	0.05	The available data indicate that the tolerance should be lowered.
Peanuts, hay	100.0	20.0	Residue data support a lower tolerance.
Peas, cowpeas	5.0	Reassign	Tolerance should be reassignd concomitant with establishing a 1.0 ppm tolerance for *dried, shelled pea and bean (except soybean)* group.
Peas, cowpeas, Forage	100.0	Reassign	Tolerances should be reassignd concomitant with establishing a 60.0 ppm tolerance for *vegetable, foliage of legume, group*.
Peas, cowpeas, Hay	100.0		
Peas, vines	100.0		

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Peas, with pods	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance for *vegetable, legume, edible-podded subgroup* (crop subgroup 6A).
Pecans	1.0	Reassign	Tolerance should be reassignd concomitant with establishing a 0.1 ppm tolerance on the *nuts, tree, group (excluding walnuts)*.
Peppers	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 5.0 ppm tolerance on the vegetable, fruiting group (excluding cucurbits) crop group.
Pistachio	1.0	0.10	Residue data indicate that the tolerance should be lowered.
Plums (fresh prunes)	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 10.0 ppm tolerance on the *fruit, stone, group*.
Potatoes	0.20	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetable, root and tuber, group (excluding sugar beets and sweet potatoes)*.
Prickly pear cactus, fruit	12.0	5.0	Residue data indicate that the tolerance should be decreased.
Prickly pear cactus, pads	12.0	12.0	
Pumpkins	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 3.0 ppm tolerance on the *vegetable, cucurbit, group.*
Radishes	5.0	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetable, root and tuber, group (excluding sugar beets and sweet potatoes)*.
Raspberry	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 12.0 ppm tolerance on the *caneberry* crop subgroup.
Rice	5.0	15.0	*Rice, grain*; the residue data indicate that the tolerance should be increased.
Rice, straw	100.0	60.0	Residue data support lowering the tolerance to 60.0 ppm.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Rutabagas	5.0	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetable, root and tuber, group (excluding sugar beets and sweet potatoes)*.
Rye, fodder, green	100.0	Revoke	The registrant does not intend to support carbaryl uses on rye
Rye, grain	0.0		
Rye, straw	100.0		
Salsify, roots	5.0	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetable, root and tuber, group (excluding sugar beets and sweet potatoes)*.
Salsify, tops	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 75.0 ppm tolerance on the *leaves of vegetables, root and tuber vegetables, group (excluding sugar beets tops)*.
Sorghum grain, forage	100.0	30.0	Residue data indicate that the tolerance should be lowered.
Sorghum grain, grain	10.0	10.0	
Soybean	5.0	0.50	Residue data support lowering the tolerance to 0.5 ppm.
Soybean, forage	100.0	15.0	Residue data support lowering the tolerance to 15.0 ppm.
Soybean, hay	100.0	15.0	Residue data support lowering the tolerance to 15.0 ppm.
Spinach	12.0	22.0	Residue data on spinach indicate that a higher tolerance is required.
Squash, summer	10.0	Reassign	Tolerances should be reassignd concomitant with establishing a 3.0 ppm tolerance on the *vegetable, cucurbit group* .
Squash, winter	10.0		
Strawberries	10.0	4.0	Residue data indicate that the tolerance should be lowered to 4.0 ppm.
Sunflower, seed	1.0	0.50	Residue data indicate that the tolerance should be lowered to 0.5 ppm.
Sweet potatoes	0.20	0.20	potato, sweet
Swiss chard	12.0	Reassign	The tolerance should be reassignd concomitant with establishing a 3.0 ppm tolerance on the *leaf petioles* crop subgroup.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Tomatoes	10.0	Reassign	Tolerance should be reassignd concomitant with establishing a 5.0 ppm tolerance on the *vegetables, fruiting group(excluding cucurbits*).
Trefoil, birdsfoot, forage	100.0	15.0	Residue data on alfalfa forage will translate to *trefoil, forage*.
Trefoil, birdsfoot, hay	100.0	25.0	Residue data on alfalfa hay will translate to *trefoil, hay*.
Turnips, roots	5.0	Reassign	Tolerance should be reassignd concomitant with establishing a 2.0 ppm tolerance on the *vegetable, root and tuber, group (excluding sugar beets and sweet potatoes)*.
Turnips, tops	12.0	Reassign	Tolerance should be reassignd concomitant with establishing a 75.0 ppm tolerance on the *leaves of vegetables, root and tuber, group (excluding sugar beets tops)*.
Walnuts	1.0	1.0	
Wheat, fodder, green	100.0	30.0	The available data indicate that the tolerance should be lowered. *Wheat, forage*
Wheat, grain	3.0	1.0	Residue data indicate that the tolerance should be lowered.
Wheat, straw	100.0	20.0	The available data indicate that the tolerance should be lowered.
Tolerance Listed Under 40 CFR §180.169(b)			
Cattle, goats, horses and sheep, **fat**	0.10	0.50	Residue data support increasing the tolerance
Hog, **fat**	0.10	0.05	Residue data support lowering the tolerance
Cattle, goats, horses, and sheep, **meat**	0.10	1.0	
Hog, **meat**	0.10	0.10	

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Cattle, goats, horses and sheep, **kidney & Liver**	1.0	Reassign	Tolerances should be reassignd concomitant with establishing a 3.0 ppm tolerance for *meat byproducts* of cattle, goats, horses, and sheep.
Cattle, goats, horses, and sheep, **mbyp (exc. kidney & liver)**	0.10		
Hog, **kidney & Liver**	1.0	Reassign	Tolerances should be reassignd concomitant with establishing a 0.5 ppm tolerance for hog *meat byproducts*
Hog, **mbyp (exc. kidney & liver)**	0.10		
Poultry, fat and meat	5.0	Revoke	A Category 3
Tolerance Listed Under 40 CFR §180.169(c)			
Milk	0.30	1.0	Should be moved to 40 CFR §180.169(b)
Tolerance Listed Under 40 CFR §180.169(d)			
Pineapple	2.0	TBD	Residue data are required
Pome fruits	10.0	12.0	The residue data indicate that the tolerance should be increased.
Tolerance Listed Under 40 CFR §180.169(e)			
Avocados	10.0	Revoke	The registrant is not supporting this use.
Dill (fresh)	0.20	0.20	
Interim Tolerance Listed Under 40 CFR §180.319			
Eggs	0.50	Revoke	Category 3.
0**Tolerance Listed Under 40 CFR §186.550**			
Pineapple, bran, wet and dry	20.0	Revoke	No longer considered a significant processed commodity.
Tolerances Needed Under 40 CFR §180.169(a)			
Separate plant commodities			
Apple, wet pomace	None	15.0	Residue data support establishing a 15.0 ppm tolerance on wet apple pomace.
Aspirated grain fractions	None	70	The available data indicate that a tolerance of 70 ppm should be established for residues in/on aspirated grain fractions.
Beet, sugar, roots	None	0.50	The available data indicate that a tolerance of 0.5 ppm should be established for residues in/on sugar beet roots.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Citrus, fruit, oil	None	20.0	Residue data support establishing a 20.0 ppm tolerance on citrus fruit oil.
Cotton, gin byproducts	None	TBD	Residue data are required.
Grapes, raisins	None	12.0	Residue data support establishing a 12.0 ppm tolerance on raisin.
Millet, proso, hay	None	TBD	Residue data are required. Residue data required on wheat hay may be translatable to proso millet hay.
Rice, hulls	None	30.0	Residue data support establishing a 30.0 ppm tolerance for residues in/on rice hulls.
Sorghum, stover	None	30.0	Residue data support establishing a 30.0 ppm on *sorghu grain, stover*.
Wheat, hay	None	TBD	Residue data are required.
Livestock commodities			
Cattle, goats, horses and sheep, meat byproducts	None	3.0	Concomitant with reassigning separate tolerances for residues in kidney and liver and meat byproducts (excluding kidney and liver), separate 3.0 ppm tolerances are required on meat byproducts of cattle, goats, horses, and sheep.
Hog, meat byproducts	None	0.50	Residue data support establishing a 0.5 ppm tolerance on meat byproducts of hog; the separate tolerances for residues in kidney and liver and meat byproducts (excluding kidney and liver) of hog should be reassigned.
Croup group/subgroups			
Brassica leafy greens	None	10.0	Concomitant with reassigning separate tolerances on Chinese cabbage, collards, kale, and mustard greens, a 10.0 ppm tolerance on the *vegetable, Brassica, leafy, group* crop subgroup should be established.
Bushberry	None	3.0	Residue data support establishing a 3.0 ppm tolerance on the *bushberry* crop subgroup; the separate tolerance on blueberry should be reassigned.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Caneberry	None	12.0	Concomitant with reassigning separate tolerances on blackberry, boysenberry, dewberry, loganberry, and raspberry, a 12.0 ppm tolerance on the *caneberry* crop subgroup should be established.
Cucurbit Vegetables	None	3.0	Residue data support establishing a 3.0 ppm tolerance on the *vegetable, cucurbit groups* crop group; separate tolerances on cucumbers, melons, pumpkins, and summer and winter squash should be reassigned.
Dried, shelled pea and bean (except soybean)	None	1.0	Concomitant with reassigning separate tolerances on beans, cowpeas, and lentils, a 1.0 ppm tolerance should be established on the *dried, shelled pea and bean (except soybean)* crop subgroup (6C).
Edible-podded legume vegetables	None	10.0	Concomitant with reassigning separate tolerances on peas (with pods), a 10.0 ppm tolerance should be established on the *edible-podded legume vegetables* crop subgroup (6A).
Foliage of legume vegetables except soybeans	None	60.0	Concomitant with reassigning separate tolerances on cowpea forage and hay, and pea vines, a 60.0 ppm tolerance should be established on the *foliage of legume vegetables except soybeans* crop subgroup.
Fruiting vegetables (excluding cucurbits)	None	5.0	Residue data support establishing a 5.0 ppm tolerance on the *vegetables, fruiting group(excluding cucurbits)* crop group; separate tolerances on eggplants, peppers, and tomatoes should be reassigned.
Leaf petioles	None	3.0	Residue data support establishing a 3.0 ppm tolerance on the *leaf petioles* crop subgroup; the separate tolerances on celery and swiss chard should be reassigned.
Leaves of root and tuber vegetables (excluding sugar beet)	None	75.0	Concomitant with reassigning separate tolerances on garden beet, salsify, and turnip tops, a 75.0 ppm tolerance on the *leaves of root and tuber vegetables crop group (excluding sugar beet tops)* should be established.

(continued; footnotes follow)

Table C *(continued)*.

Commodity	Current Tolerance (ppm)	Tolerance Reassessment (ppm)	Comments [*Correct Commodity Definition*]
Root and tuber vegetables (excluding sugar beet roots and sweet potatoes)	None	2.0	Concomitant with reassigning separate tolerances on garden beet roots, carrots, horseradish, potatoes, parsnips, radishes, rutabagas, salsify roots, and turnip roots, a 2.0 ppm tolerance on the *root and tuber vegetables crop group (excluding sugar beet roots and sweet potatoes)* should be established.
Stone fruits	None	10.0	Concomitant with reassigning separate tolerances on apricots, cherries, nectarines, peaches, and plums (fresh prunes), a 10.0 ppm tolerance on the fruit, stone, group should be established.
Tree nuts (excluding walnuts)	None	0.10	Concomitant with reassigning separate tolerances on almonds, chestnuts, filberts, and pecans, a 0.1 ppm tolerance on the *nuts, tree, group (excluding walnuts)* should be established.

[1] TBD = To be determined. Reassessment of tolerance(s) cannot be made at this time because additional data are required.

CODEX HARMONIZATION

The Codex Alimentarius Commission has established maximum residue limits (MRLs) for carbaryl residues in/on various plant and livestock commodities (see Guide to Codex Maximum Limits For Pesticide Residues, Part A.1, 1995). The Codex MRLs and U.S. tolerances are not compatible because the U.S. tolerance expression includes parent carbaryl and its metabolite 1-naphthol for most raw crop commodities [40 CFR §180.169(a)]; tolerances for residues in livestock commodities are expressed as carbaryl and its metabolites 1-naphthol, 5,6-dihydrodihydroxy carbaryl, and 5,6-dihydrodihydroxy naphthol [40 CFR §180.169(b)]. Only the established tolerances for residues in/on pineapples, pome fruits, avocados, and fresh dill are expressed in terms of carbaryl *per se*. However, the HED Metabolism Committee (MARC) determined that the U.S. tolerance expression for plant comodities be amended to include only carbaryl *per se* (S. Hummel, 2/8/96). Once the U.S. tolerance definition is amended, it will be compatible with the definition for Codex MRLs. The MARC has recommended that the tolerance expression for livestock commodities include the free and conjugated forms of carbaryl, 5,6-dihydro-5,6-dihydroxy carbaryl, and 5-methoxy-6-hydroxy carbaryl. The Codex MRLs and U.S. tolerances cannot be made compatible for livestock commodities with respect to the tolerance definition.

A comparison of the Codex MRLs and the corresponding **reassessed** U.S. tolerances is presented in Table D.

The following conclusions can be made regarding efforts to harmonize the U.S. tolerances with the Codex MRLs:

Once the U.S. tolerance definition is amended to include only carbaryl *per se*, U.S. tolerances and Codex MRLs would be compatible for the following crops and commodities: apricot, beetroot, carrot, cherries, cowpea (dry), cucumber, egg plant, hay or fodder (dry) of grasses, leafy vegetables, melons (except watermelon), nectarine, olives, parsnip, peppers, plums (including prunes), pumpkins, radish, tomato, and winter squash.

Based upon the use patterns registered in the U.S. and the available residue data, compatibility of U.S. tolerances and Codex MRLs is not currently possible for the following crops/commodities: Alfalfa forage, apple, asparagus, blackberries, cabbage, milk, meat of cattle, goats, and sheep, citrus fruits, clover, common bean, cranberry, dewberries (including boysenberry and loganberry), grapes, maize forage, okra, pea vines, peanut (whole and fodder), pear, peas (podded and succulent), potato, raspberries, sorghum forage, soya bean (dry), soya bean forage, strawberry, sugar beet, sugar beet tops, sweet corn (kernels), and tree nuts.

Table D. Codex MRLs for carbaryl and applicable U.S. tolerances for carbaryl.

Codex			Reassessed U.S. Tolerance (ppm)[2]	Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Alfalfa forage (green)	100	CXL	15.0	U.S residue data support the lower reassessed tolerance
Apple	5	CXL	12.0	Tolerance to be established for pome fruits crop group; U.S. residue data indicate that the tolerance cannot be lowered.
Apricot	10	CXL	10.0	Tolerance to be established for fruit, stone, group
Asparagus	10	CXL	15.0	U.S residue data support the higher reassessed tolerance
Banana	5	CXL	5	
Barley	5 (Po)	CXL	None	Not registered for use in the U.S.
Bean forage (green)	100	CXL	None	No longer regulated as a feed item in the U.S.
Beetroot	2	CXL	2.0	Tolerance to be established on the root and tuber vegetables crop group (excluding sugar beets and sweet potatoes) which includes *garden beet roots*.
Blackberries	10	CXL	12.0	Tolerance to be established for caneberry crop subgroup; U.S. residue data indicate that the tolerance cannot be lowered.
Blueberries	7	CXL	4.0	Tolerance to be established for bushberry crop subgroup; U.S. residue data support the lower reassessed tolerance.
Cabbages, head	5	CXL	21.0	U.S residue data support the higher reassessed tolerance
Carrot	2	CXL	2.0	Tolerance to be established on the root and tuber vegetables crop group (excluding sugar beets and sweet potatoes).
Cattle meat	0.2	CXL	1.0	U.S tolerance expression includes metabolites not included in Codex MRL expression, resulting in a higher numerical level.
Cherries	10	CXL	10.0	Tolerance to be established for fruit, stone, group

(continued; footnotes follow)

Table D *(continued)*.

Codex			Reassessed U.S. Tolerance (ppm)[2]	Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Citrus fruits	7	CXL	10.0	Tolerance to be established for citrus fruits crop group; U.S. residue data indicate that the tolerance cannot be lowered.
Clover	100 fresh wt	CXL	50.0	U.S residue data support the lower reassessed tolerance
Common bean (pods and or immature seeds)	5	CXL	10.0	Tolerance to be established for *edible-podded legume vegetables* (crop subgroup 6A); U.S. residue data indicate that the tolerance cannot be lowered.
			TBD	Data are not available for succulent, shelled pea and beans
Cotton seed	1	CXL	Revoke	Uses in the U.S. are cancelled.
Cowpea (dry)	1	CXL	1.0	Tolerance to be established for dried, shelled pea and bean (except soybean) crop subgroup.
Cranberry	7	CXL	3.0	U.S residue data support the lower reassessed tolerance
Cucumber	3	CXL	3.0	Tolerance to be established for vegetable, cucurbit groups crop group
Dewberries (including boysenberry and loganberry)	10	CXL	12.0	Tolerance to be established for caneberry crop subgroup; U.S. residue data indicate that the tolerance cannot be lowered.
Egg plant	5	CXL	5.0	Tolerance to be established for vegetables, fruiting group(excluding cucurbits) crop group
Eggs	0.5	CXL	None	Dermal and poutry house uses cancelled in the U.S. Category 3 of 40 CFR §180.6(a) exists for U.S.
Goat meat	0.2	CXL	1.0	U.S tolerance expression includes metabolites not included in Codex MRL expression, resulting in a higher numerical level.
Grapes	5	CXL	10.0	U.S residue data support the higher reassessed tolerance

(continued; footnotes follow)

Table D *(continued)*.

Codex			Reassessed U.S. Tolerance (ppm)[2]	Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Hay or fodder (dry) of grasses	100	CXL	100.0	
Kiwifruit	10	CXL	None	Not registered for use in the U.S.
Leafy vegetables	10	CXL	3.0 and 10.0	Tolerances to be established on the Vegetable, Brassica, leafy, group and leaf petioles crop subgroups, 10.0 and 3.0 ppm, respectively, together with separate tolerances on broccoli, Brussels sprouts, cauliflower, endive, and kohlrabi
			21.0	U.S residue data on spinach support the higher reassessed tolerance
Maize forage (fresh wt)	100	CXL	30.0	U.S residue data on field corn forage support the lower reassessed tolerance
			185.0	U.S residue data on sweet corn forage support the higher reassessed tolerance
Melons, except watermelon	3	CXL	3.0	Tolerance to be established for vegetable, cucurbit groups crop group
Milk products	0.1(*)	CXL	None	A U.S. tolerance is not established on milk products
Milks	0.1 (*)	CXL	1.0	U.S tolerance expression includes metabolites not included in Codex MRL expression, resulting in a higher numerical level.
Nectarine	10	CXL	10.0	Tolerance established for fruit, stone, group
Nuts (whole in shell) except peanut, whole and tree nuts	10	CXL	0.1	Tolerance to be established for tree nuts, except walnuts crop group
Oats	5 (Po)	CXL	None	Not registered for use in the U.S.
Okra	10	CXL	4.0	U.S residue data support the lower reassessed tolerance
Olives	10	CXL	10.0	
Olives, processed	1	CXL	None	U.S residue data do not support a separate tolerance for olive processed commodities

(continued; footnotes follow)

Table D *(continued)*.

Codex			Reassessed U.S. Tolerance (ppm)[2]	Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Parsnip	2	CXL	2.0	Tolerance to be established on the vegetables, root and tuber, group (excluding sugar beets and sweet potatoes).
Pea vines (green) (Fresh wt)	100	CXL	TBD	Residue data are required (preferably on Austrian winter pea)
Peanut fodder	100	CXL	20.0	Tolerance established for peanut hay; U.S. residue data support the lower reassessed tolerance.
Peanut, whole	2	CXL	0.05	U.S. residue data support the lower reassessed tolerance.
Pear	5	CXL	12.0	Tolerance to be established for pome fruits crop group; U.S. residue data indicate that the tolerance cannot be lowered.
Peas (pods and succulent = immature seeds)	5	CXL	10.0	Tolerance to be established for *edible-podded legume vegetables* (crop subgroup 6A); U.S. residue data indicate that the tolerance cannot be lowered.
			TBD	Data are not available for succulent, shelled pea and beans
Peppers	5	CXL	5.0	Tolerance to be established for vegetables, fruiting group(excluding cucurbits) crop group
Plums (including prunes)	10	CXL	10.0	Tolerance to be established for fruit, stone, group
Potato	0.2	CXL	2.0	Tolerance to be established on the root and tuber vegetables crop group (excluding sugar beets and sweet potatoes); U.S. residue data indicate that the tolerance cannot be lowered.
Poultry meat	0.5 (V)	CXL	None	Dermal and poutry house uses cancelled in the U.S. Category 3 of 40 CFR §180.6(a) exists for U.S.
Poultry skin	5	CXL	None	
Pumpkins	3	CXL	3.0	Tolerance to be established for vegetable, cucurbit groups crop group

(continued; footnotes follow)

Table D *(continued)*.

Codex			Reassessed U.S. Tolerance (ppm)[2]	Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Radish	2	CXL	2.0	Tolerance to be established on the root and tuber vegetables crop group (excluding sugar beets and sweet potatoes).
Raspberries, red and black	10	CXL	12.0	Tolerance to be established for caneberry crop subgroup; U.S. residue data indicate that the tolerance cannot be lowered.
Rice	5 (PoP)	CXL	15.0	Not registered for postharvest use on rice and rye in the U.S.
Rice, husked	5 (Po)	CXL	None	
Rye	5 (Po)	CXL	None	
Sheep meat	0.2	CXL	1.0	U.S tolerance expression includes metabolites not included in Codex MRL expression, resulting in a higher numerical level.
Sorghum	10 (Po)	CXL	None	Not registered for this use in the U.S.
Sorghum forage (green) (fresh wt)	100	CXL	30.0	U.S residue data support the lower reassessed tolerance
Soya bean (dry)	1	CXL	0.5	U.S residue data support the lower reassessed tolerance
Soya bean forage (green) (fresh wt)	100	CXL	15.0	U.S residue data support the lower reassessed tolerance
Squash, summer	3	CXL	3.0	Tolerance to be established for vegetable, cucurbit groups crop group
Strawberry	7	CXL	4.0	U.S residue data support the lower reassessed tolerance
Sugar beet	0.2	CXL	0.5	U.S residue data support the higher reassessed tolerance
Sugar beet leaves or tops	100	CXL	25.0	U.S residue data support the lower reassessed tolerance
Swede	2	CXL	2.0	Tolerance to be established on the root and tuber vegetables crop group (excluding sugar beets and sweet potatoes).

(continued; footnotes follow)

Table D *(continued)*.

Codex			Reassessed U.S. Tolerance (ppm)[2]	Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Sweet corn (kernels)	1	CXL	0.1	U.S residue data support the lower reassessed tolerance for sweet corn (K+CWHR)
Tomato	5	CXL	5.0	Tolerance to be established for vegetables, fruiting group(excluding cucurbits) crop group
Tree nuts	1	CXL	0.1	Tolerance to be established for nuts, tree, group (excluding walnuts); U.S residue data support the lower reassessed tolerance
			1.0	Tolerance established for walnuts
Wheat	5 (Po)	CXL	1.0	Not registered for postharvest use on wheat in the U.S.
Wheat bran, unprocessed	20 (PoP)	CXL	None	
Wheat flour	0.2(PoP)	CXL	None	
Wheat wholemeal	2	CXL	None	A separate tolerance on processed commodities of wheat is not needed
Winter squash	3	CXL	3.0	Tolerance to be established for vegetable, cucurbit groups crop group

[1] An asterisk (*) signifies that the MRL was established at or about the limit of detection. A “Po” or “PoP” following the MRL indicate that the MRL was established based on postharvest uses.

[2] Recommendations for compatibility are based on conclusions following reassessment of U.S. tolerances (see Table C).

AGENCY MEMORANDA RELEVANT TO REREGISTRATION

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
2/25/88	None	3357	M. Nelson	H. Jamerson and Toxicology Branch	None	PP#7E3543 - Carbaryl in or on Dill - Amendment of 1/18/88.
3/28/88	None	3027	M. Nelson	D. Edwards and Toxicology Branch	40376001, 40376002	PP#7F3490 - Carbaryl in or on Sugar Beet Roots - Amendment of 10/6/87.
4/25/88	None	3510	M. Kovacs	H. Jamerson and Toxicology Branch	40512501	PP#2E2667 - Carbaryl in or on Potatoes - Amendment Dated January 27, 1988.
10/5/90	None	6972	H. Fonouni	W. Boodee	41594301	Carbaryl in/on Wheat, Amended Use Registration No. 264-333.
4/9/92	D176240	9659	R. Perfetti	W. Burnam and L. Rossi	None	Aventis Ag Company: Response to the Carbaryl Reregistration Standard: Residue Chemistry Comments.
12/2/93	D193129	12374	S. Hummel	J. Loranger/L. Propst and D. Utterback	None	Carbaryl (056801) Anticipated Residues for Carcinogenic Dietary Risk Assessment.
2/25/94	D194407	12405	S. Hummel	J. Loranger/L. Propost and D. Utterback	42883101-42883104	Carbaryl (056801; Case No. 0080) Field Trial Protocols, Waiver Requests

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
8/5/94	D204888	13984	J. Garbus	D. Edwards and R. Kumar	None	WA-90-0013: Special Local Need Label [24(c)] for Carbaryl (SEVIN 80S) for Use in Washington State on Oyster Beds
5/22/95	D213142	15275	S. Hummel	J. Loranger/L. Propst	None	Carbaryl (056801) Reregistration Case No. 0080 DCI for Field Trials on Onions, Barley, Oats, and Rye; and Sweet Sorghum Processing Data
5/31/95	D215259	15565	S. Hummel	Files	None	Carbaryl (056801) Reregistration Case No. 0080 Analysis of Pineapple Bran Feed Additive Tolerance with Respect to the DES Proviso
11/28/95	D204197	13831	S. Hummel	J. Loranger	43249101-43249103	Carbaryl (056801) Reregistration Case No. 0080 Metabolism in Lettuce, Radish, and Soybeans GLN 171-4(a).
11/28/95	D206777	14249	S. Hummel	J. Loranger	43324601	Carbaryl (056801) Reregistration Case No. 0080 Metabolism in Poultry GLN 171-4(b).
1/19/96	D221978	16669	S. Hummel	HED Metabolism Committee	None	Carbaryl (056801) Reregistration Case No. 0080 Issues to be presented to HED Metabolism Committee on 1/25/96
1/22/96	D216544	15757	S. Hummel	J. Loranger	43672701 43672702	Carbaryl (056801) Reregistration Case No. 0080 Plant Analytical Methods GLN 171-4(c), Independent Laboratory Validation of Proposed Enforcement Method
2/8/96	D221979	16670	S. Hummel	HED Metabolism Committee	None	Carbaryl (056801) Reregistration Case No. 0080 HED Metabolism Committee Decision; Meeting on 1/25/96.

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
3/15/96	D211172	16516	S. Hummel	J. Loranger	None	Carbaryl (056801) Reregistration Case No. 0080 Metabolism in Lettuce, Radish, and Soybeans GLN 171-4(a) Corrected Study Pages for MRIDs 43249101 and 43249103 (Update to CB 13831, DP Barcode D204197).
8/21/96	D225659, D226582	17209, 17243	F. Suhre	J. Loranger	43984701, 43996101	Carbaryl (056801) Reregistration Case No. 0080 Magnitude of the Residue in Succulent Bean and Tomato; GLN 171-4(k)
9/13/96	D218865, D219999, D220949, D221158, D223008, D219971, D220601, D220948, D221313, D225204, D225576	16140, 16364, 16555, 16559, 16887, 16329, 16460, 16556, 16584, 17127, 17147	F. Suhre	P. Deschamp	43786801, 43793201, 43793202, 43802101-43802103, 43818901, 43845205, 43850901, 43850902, 43915201, 43975601, 43982801	Carbaryl (056801) Reregistration Case No. 0080 Magnitude of the Residue Studies (GLN 171-4(k)) on Several Crops; Processing Studies (GLN 171-4(l)) on Field Corn, Cottonseed, and Sunflower; Storage Stability Studies (GLN 171-4(e)) for Representative Crops.
10/7/96	D217179, D217172, D217177, D217631, D217704, D217705	15829, 15830, 15832, 15897, 15946, 15952	F. Suhre	P. Deschamp	43677401, 43686701, 43686702, 43694101-43694105, 43697601-43697604, 43698201-43698203, 43702001-43702003, 43703101-43703103, 43716601, 43721001	Carbaryl (056801) Reregistration Case No. 0080 Magnitude of the Residue (GLN 171-4(k)) and Processing (GLN 171-4(l)) studies on numerous crops.
9/11/97	D234692	None	C. Olinger	J. Loranger	None	Carbaryl: Over-Tolerance Residues on Spinach; Chemical No. 56801.

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
1/22/98	D240441	None	C. Olinger	K. Boyle	None	Carbaryl: Request for Waiver of Field Trials Using Granular Formulation; Chemical No. 56801
4/9/98	D240998, D237653	None	C. Olinger	V. Dobozy	44321301 and 44412501	Reregistration of Carbaryl: Olive Field Trial and Wheat Storage Stability; Chemical No. 56801.
5/12/98	D227765, D227009	17424 17444	M. Perry	J. Loranger	44019701, 44046101	Carbaryl. Aventis Ag Company. Reregistration Case No. 0080. Peanut Processing Study and Amended Report to Broccoli Field Trial Study.
5/22/98	D230900, D231134	17626 and 17655	M. Perry	J. Loranger	44123101, 44145201	Carbaryl. PC Code 056801. Reregistration Case No. 0080. IR-4 Submission of Okra and Prickly Pear Magnitude of the Residue Studies (GLN 860.1500)
5/26/98	D230246, D230406, D231533	17610, 17606, and 17689	M. Perry	J. Loranger	44058101, 44072901, and 44155401	Carbaryl. PC Code 056801. Reregistration Case No. 0080. Magnitude of the Residue Data in/on Sweet Corn and Pome Fruits and ILV Data on Enforcement Method for Oily Crops.
9/10/98	D215844	None	C. Olinger	V. Dobozy	43651701	Reregistration of Carbaryl: Confined Rotational Crop Study; Chemical No. 56801.
9/29/98	D230407	None	T. Morton	K. Boyle	44114301	Carbaryl Reregistration - Evaluation of tobacco pyrolysis study to satisfy GLN 860.1500.
9/17/98	D206443	14130	T. Morton	K. Boyle	None	Carbaryl (056801); Reregistration Case No. 0080) Review of Revised Labels for EPA Reg. No. 264-315 and 264-321.

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
9/17/98	D216242, D219527, D219596, and D220287	15690, 16235, 16266, and 16384	T. Morton	K. Boyle	43654201, 43786802-43786806, 43794901-43794903, 43813601-43813604	Carbaryl: PC Code 56801, Case No. 0080. Residue Analytical Methods, and Magnitude of the Residue in/on Asparagus; Beans (dry); Cabbage; Cucurbits; Mustard Greens; Root and Tuber Vegetables including Beets, Carrots, and Turnips; Sorghum; Sunflowers; and Processed Commodities of Rice; Sorghum; Soybeans; and Wheat.
5/6/99	D255855	None	C. Olinger	G. Kramer	None	Metabolism of Carbaryl in Dairy Cattle; Briefing Memorandum for HED Metabolism Assessment Review Committee; Chemical No. 56801
6/17/99	D255855	None	C. Olinger	G. Kramer	None	Metabolism of Carbaryl in Dairy Cattle; HED Metabolism Assessment Review Committee Decision Memorandum; Chemical No. 56801
11/9/99	D228656 and D235113	None	C. Olinger	V. Dobozy	44068401, 44250301	Reregistration of Carbaryl: Storage Stability Studies; Chemical No. 56801
11/9/99	D228260 and D228652	None	C. Olinger	V. Dobozy	44321301, 44412501	Reregistration of Carbaryl: Field Corn and Rangeland Grass Field Trial Studies; Chemical No. 56801
11/9/99	D236422 and D236485	None	C. Olinger	V. Dobozy	44321301, 44412501	Reregistration of Carbaryl: Stone Fruit and Orange Field Trial Studies; Chemical No. 56801
12/15/99	D236574, D236421, D240469	None	C. Olinger	V. Dobozy	44250901, 44286901-44286903, 44381901	Reregistration of Carbaryl: Livestock Analytical Method, Storage Stability, and Magnitude of Residue Studies; Chemical No. 56801

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
10/2000	D266186	None	F. Fort	V. Dobozy	45115402, 45115403, 45115404, 45115405, 45115406, 45115407, 45115408, 45115409, 45189102	Reregistration of Carbaryl: Magnitude of the Residue in/on Various Cops Resulting from Ground Applications of Liquid and Granular Formulations, Chemical No. 56801

MASTER RECORD IDENTIFICATION NUMBERS

[Note: references for MRIDs 05001852-05019959, representing published material, were unavailable for citation]

00015669 Knaak, J.B.; Tallant, M.J.; Bartley, W.J.; et al. (1965) The metabolism of Carbaryl in the rat, guinea pig, and man. Journal of Agricultural and Agricultural and Food Chemistry 13(6):537-543. (Also in unpublished submission received Sep 26, 1974 under 5G1553; submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:094221-C)

00049135 Kuhr, R.J.; Casida, J.E. (1966?) Persistent Glycosides of Metabolites of Methylcarbamate Insecticide Chemicals Formed by Hydroxylation in Bean Plants: Report No. 19547. (Unpublished study received Jul 15, 1976 under 3125-EX-135; prepared by Univ. of California--Berkeley, Div. of Entomology, submitted by Mobay Chemical Corp., Kansas City, Mo.; CDL:226512-G)

00053897 Union Carbide Corporation (1975) Introduction: [Carbaryl]. (Reports by various sources; unpublished study including published data, received Oct 14, 1976 under 7F1878; CDL:095306-B)

00058927 Union Carbide Corporation (1977) Determination of Carbaryl Residues in Sunflowers. Method dated May 1977. (Unpublished study received Jan 7, 1980 under 5E1564; submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:099745-B)

00058928 Interregional Research Project Number 4 (1978) Carbaryl: Residue Tolerance Petition--Sunflowers. (Reports by various sources; unpublished study received on unknown date under 5E1564; CDL: 099745-C)

00061103 Johnson, D.P.; Critchfield, F.E.; Arthur, B.W. (1963) Determination of Sevin insecticide and its metabolites in poultry tissues and eggs. Journal of Agricultural and Food Chemistry 11(1): 77-80. (Also In unpublished submission received 1963 under unknown ad-min. no.; submitted by Union Carbide Corp., Arlington, Va.; CDL:129334-D)

00061106 Claborn, H.V.; Roberts, R.H.; Mann, H.D.; et al. (1963) Residues in body tissues of livestock sprayed with Sevin or given Sevin in the diet. Journal of Agricultural and Food Chemistry 11(1): 74-76. (Also In unpublished submission received 1963 under unknown admin. no.; submitted by Union Carbide Corp., Arlington, Va.; CDL:129334-H)

00074366 Interregional Research Project Number 4 (1979) Carbaryl: Residue Tolerance Petition--Flax. (Compilation; unpublished study received Apr 7, 1981 under 1E2498; CDL:099997-A)

00074367 McBride, D.K. (1979) Carbaryl (Sevin) Residue Trial--Flax (PR# 1084). (Unpublished study received Apr 7, 1981 under 1E2498, prepared by North Dakota State Univ. of Agriculture and Applied Science, submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:099997-C)

00074368 Interregional Research Project Number 4 (1979) Carbaryl: Residue Tolerance Petition--Millet: Summary. (Compilation; unpublished study received Apr 7, 1981 under 1E2497; CDL:099998-A)

00080419 Annand, A.M.; Robinson, D.H. (1965) Residues of Sevin in Tissues of Cattle Dipped at Various Frequencies in Sevin Cattle Dip: Report No. 230/102/2. (Unpublished study received Jun 1, 1966 under 7E0518; submitted by Union Carbide Corp., South Charleston, W.Va.; CDL:090613-F)

00080420 Claborn, H.V.; Roberts, R.H.; Mann, H.D.; et al. (1963) Residues in body tissues of livestock sprayed with Sevin or given Sevin in the diet. Journal of Agricultural and Food Chemistry II(1):74- 76. (Also in unpublished submission received Jun 1, 1966 under 7E0518; submitted by Union Carbide Corp., South Charleston,W.Va.; CDL:090613-G)

00080679 Union Carbide Corporation (1971) Metabolism of Carbaryl in Animals: Summary. Summary of studies 091048-R, 091048-S, 091048-U, 091048-V and 091048-AB. (Unpublished study received Dec 22, 1971 under 2F1220; CDL:091048-O)

00080680 Andrawes, N.R.; Chancey, E.L.; Crabtree, R.J.; et al. (1971) Fate of Naphthyl-1-14 C Carbaryl in Laying Chickens. (Unpublished study received Dec 22, 1971 under 2F1220; submitted by Union Carbide Corp., Arlington, Va.; CDL:091048-P)

00080681 Baron, R.L.; Locke, R.K. (1970) Utilization of cell culture techniques in carbaryl metabolism studies. Bulletin of Environmental Contamination & Toxicology 5(4):287-291. (Also in unpublished submission received Dec 22, 1971 under 2F1220; submitted by Union Carbide Corp., Arlington, Va.; CDL:091048-Q)

00080682 Bartley, W.J. (1970) Sevin Metabolism Studies: The Identification of a New Metabolite of Sevin in Milk: Project No. 111A12, File No. 14750. (Unpublished study received Dec 22, 1971 under 2F1220; submitted by Union Carbide Corp., Arlington, Va.; CDL: 091048-R)

00080683 Bartley, W.J. (1971) Sevin Metabolism Studies: The Identification of 3,4-Dihydro-3,4-dihydroxy-1-naphthyl Methylcarbamate in Milk--a New Sevin Metabolite: Project No. 111A12, File No. 15133. (Unpublished study received Dec 22, 1971 under 2F1220; submitted by Union Carbide Corp., Arlington, Va.; CDL:091048-S)

00080686 Dorough, H.W. (1971) Carbaryl Residues in Milk and Meat of Dairy Animals. (Unpublished study received Dec 22, 1971 under 2F1220; prepared by Univ. of Kentucky, Dept. of Entomology, submitted by Union Carbide Corp., Arlington, Va.; CDL:091048-V)

00080689 Pekas, J.C. (1971) Intestinal metabolism and transport of Naphthyl N-methylcarbamate *in vitro* (rat). American Journal of Physiology 220(6):2008-2012. (Also in unpublished submission received Dec 22, 1971 under 2F1220; submitted by Union Carbide Corp., Arlington, Va.; CDL:091048-Y)

00080690 Pekas, J.C.; Paulson, G.D. (1970) Intestinal hydrolysis and conjugation of a pesticidal carbamate *in vitro*. Science 170:77-78. (Also in unpublished submission received Dec 22, 1971 under 2F1220; submitted by Union Carbide Corp., Arlington, Va.; CDL:091048-Z)

00082420 Union Carbide & Carbon Corporation (1958) Summary: [Results of Residue Determinations on Apples with Sevin]. (Compilation; unpublished study received Oct 15, 1958 under PP0193; CDL: 092469-J)

00082422 Union Carbide & Carbon Corporation (1958) Summary: [Residues of Sevin on Peaches]. (Unpublished study received Oct 15, 1958 under PP0193; CDL:092469-L)

00082423 Carbide and Carbon Chemicals Company (1957) Alpha-Naphthyl N-Methyl Carbamate (Experimental Insecticide Sevin): Determination of Residues in Apples. Method 30-U1A15-4 dated Feb 20, 1957. (Unpublished study received Oct 15, 1958 under PP0193; CDL:092469-M)

00082424 Union Carbide & Carbon Corporation (1958) Summary: [Results of Residue Determinations on Beans]. (Unpublished study, including letter dated Sep 15, 1958 from C.E. Herald to J.W. Keays, received Oct 15, 1958 under PP0193; CDL:092469-O)

00083311 Union Carbide & Chem. (1957) Summary: [Evidence of Residues of Sevin on Apples]. (Compilation; unpublished study received Nov 14, 1957 under PP0155; CDL:090181-D)

00083312 Whitehurst, W.E.; Johnson, J.B. (1957) alpha-Naphthyl N-Methyl-carbamate: Determination of Residues in Apples: File No. 300-U1A15; 1543-I1. Interim rept. Method dated Feb 26, 1957. (Unpublished study received Nov 14, 1957 under PP0155; submitted by Union Carbide & Chem., New York, N.Y.; CDL:090181-E)

00083527 Union Carbide Corporation (19??) Sevin Residues in Asparagus: Summary and Discussion. (Unpublished study received Oct 2, 1961 under PP0333; CDL:092615-C)

00089348 Union Carbide & Carbon Corporation (1959) Summary: [Sevin Residue-Plums]. (Compilation; unpublished study received Aug 21, 1959 under PP0222; CDL:090250-A)

00089376 Union Carbide & Carbon Corporation (1959) The Results of Tests on the Amount of Residue Remaining on Cucumbers and Summer Squash Including a Description of the Analytical Method Used: [Sevin]. (Compilation; unpublished study received Dec 7, 1959 under PP0236; CDL:090264-A)

00089378 Union Carbide & Carbon Corporation (1960) Results of Tests To Determine Sevin Residues in Corn (Kernels Only and Kernel plus Cob with Husk Removed) and in Corn Fodder and Forage. (Compilation; unpublished study received Jan 5, 1960 under PP0243; CDL: 090270-A)

00089380 Whitehurst, W.E.; Bishop, E.T,; Critchfield, F.E. (1960) Sevin Insecticide: A Study of the Metabolic Fate in Dairy Cows: Project No. 328B. Final rept. (Unpublished study received Jan 5, 1960 under PP0243; submitted by Union Carbide & Carbon Corp., New York, N.Y.; CDL:090270-C)

00089418 Union Carbide & Carbon Corporation (1958) Summary: [Sevin and 1-Naphthol Residue Analyses]. Includes method no. 30-U1A15-7 dated Jul 9, 1958. (Compilation; unpublished study received Dec 19, 1958 under PP0203; CDL:090231-A)

00089420 Union Carbide & Carbon Corporation (1958) Summary: [Sevin and 1-Naphthol Residue Analyses]. Includes method no. 30-U1A15-7 dated Jul 9, 1958. (Compilation; unpublished study received Dec 19, 1958 under PP0203; CDL:090231-C)

00089455 Union Carbide & Carbon Corporation (1957) Summary: [Residues of Sevin on Pears]. (Compilation; unpublished study received Jan 31, 1958 under PP0165; CDL:090191-A)

00089458 Union Carbide & Carbon Corporation (1957) Summary: [Analyses for Sevin Residues on Grapes]. Includes method 30-U1A15-4 dated Feb 20, 1957. (Compilation; unpublished study received Feb 24, 1958 under PP0169; CDL:090196-A)

00089600 Union Carbide & Carbon Corporation (1959) The Results of Tests on the Amount of Residue Remaining on Tomatoes, Eggplants and Peppers Including a Description of the Analytical Method Used: [Sevin]. Includes method 30-U1A15-7 dated Jul 9, 1958. (Compilation; unpublished study received Oct 30, 1959 under PP0228; CDL:090257-A)

00089679 Union Carbide & Carbon Corporation (1957) Summary: [Residues of Sevin on Beans]. (Compilation; unpublished study received Feb 6, 1958 under PP0167; CDL:090193-A)

00089680 Carbide and Carbon Chemicals Company (1957) Alpha-Naphthyl N-Methyl Carbamate (Experimental Insecticide Sevin): Determination of Residues in Apples. Method 30-U1A15-4 dated Feb 20, 1957. (Unpublished study received Feb 6, 1958 under PP0167; CDL: 090193-B)

00089681 Swango, W.H.; Herald, C.E.; Massie, J.L.; et al. (1957) Insecticide Sevin: Determination on Green Beans: File No. 307-U-1A15. Final rept. (Unpublished study received Feb 6, 1958 under PP0167; submitted by Union Carbide & Carbon Corp., New York, N.Y.; CDL:090193-C)

00089836 U.S. Agricultural Research Service (1960) Residues in Animal Tissues following Dermal Application and Feeding with Sevin: Special Report K-64. (Unpublished study; CDL:090343-B)

00089837 Union Carbide Corporation (1961) Results of Tests To Determine Residues of Sevin in (1) the Green Forage and/or Cured Hay or Crop Refuse of Alfalfa, Bean, Clovers, Cotton, Cowpea, Grasses, Peanut, Rice, Sorghum, Soybean, Sugarbeet, and (2) in Sorghum Grain, Cowpeas, Peanuts, Rice and Soybean. (Compilation; unpublished study received Mar 10, 1961 under PP0302; CDL:090343-C)

00089868 Union Carbide Chemicals Company (1962) Results of Tests To Determine Sevin Residues in Spinach Group, Lettuce Group, Blackberry Group and Root Crops. (Compilation; unpublished study received on unknown date under PP0368; CDL:090397-B)

00090113 Union Carbide Chemicals Company (1961) Sevin Residues in Garden Peas and Pea Vines. (Unpublished study received Nov 12, 1962 under PP0387; CDL:090419-A)

00090156 Union Carbide Corporation (1960) Sevin for Use on Filberts: Insect Control and Residue Data: April 1960. (Compilation; unpublished study received Oct 7, 1960 under PP0277; CDL:090299-B)

00090160 Union Carbide & Carbon Corporation (1960) Sevin Residues in Apricots and Nectarines. (Compilation; unpublished study received Nov 25, 1960 under PP0281; CDL:090303-A)

00090161 Union Carbide & Carbon Corporation (1960) Sevin Residues in Cranberries and Blueberries. (Compilation; unpublished study received Nov 25, 1960 under PP0281; CDL:090303-B)

00090162 Union Carbide & Carbon Corporation (1960) Sevin Residues on Lettuce. (Compilation; unpublished study received Nov 25, 1960 under PP0281; CDL:090303-C)

00090204 Union Carbide & Carbon Corporation (1961) Summary--Sevin Residues on Citrus. (Compilation; unpublished study received May 5, 1961 under PP0313; CDL:090331-A)

00090229 Union Carbide Corporation (1961) The Results of Tests on the Amount of Residue Remaining on Okra Including a Description of the Analytical Method Used: [Sevin]. (Unpublished study received Feb 10, 1961 under PP0296; CDL:090316-A)

00090281 Union Carbide Corporation (1961) Sevin Residues in Olives. (Compilation; unpublished study received Nov 20, 1961 under PP0337; CDL:090367-A)

00090320 Union Carbide Corporation (1961) Summary--Sevin Residue in Citrus. (Compilation; unpublished study received Aug 4, 1961 under PP0327; CDL:090354-A)

00090325 Union Carbide Corporation (1961) Results of Tests To Determine Sevin Residues in Cabbage; Broccoli, Brussels Sprouts, Cauliflower and Kohlrabi, Melons, Pumpkins and Winter Squash, and Carrots. (Compilation; unpublished study received Jun 14, 1961under PP0318; CDL:090346-A)

00091952 Oonnithan, E.S.; Casida, J.E. (1968) Oxidation of methyl- and dimethylcarbamate insecticide chemicals by microsomal enzymes and anticholinesterase activity of the metabolites. Journal of Agricultural and Food Chemistry 16(1):28044. (Also in unpublished submission received Jun 9, 1971 under 3125-EX-118; submitted by Mobay Chemical Corp., Kansas City, Mo.; CDL:126996-E)

00095927 Dorough, H.W. (1970) Metabolism of insecticidal methylcarbamates in animals. Journal of Agricultural and Food Chemistry 18(6): 1015-1022. (Also In unpublished submission received Jan 18, 1971 under 9F0843; submitted by Shell Chemical Co., Washington, D.C.; CDL:093138-AC)

00098504 Interregional Research Project Number 4 (1980) Summary of Residue Data for Carbaryl in or on Potatoes from Postharvest Treatment. (Compilation; unpublished study received Apr 7, 1982 under 2E2667; CDL:070770-A)

00103288 Interregional Research Project No. 4 (1981) The Results of Tests on the Amount of Carbaryl Residues Remaining in or on Prickley Pear Cactus Including a Description of the Analytical Method Used. (Compilation; unpublished study received Jun 17, 1982 under 2E2712; CDL:070930-A)

00107017 Union Carbide (1965) The Results of Analyses on the Amount of Residue Remaining on or in Irish Potatoes and Sweet Potatoes: [Sevin]. (Compilation; unpublished study received Sep 19, 1966 under 7F0537; CDL:090655-A)

00108985 Prudich, J.; Herald, C.; Zweig, G. (1961) Summary: [Residue Determinations for Sevin on Walnuts and Almonds]. (Unpublished study received Aug 17, 1961 under PP0329; prepared in cooperation with Univ. of California--Berkeley, submitted by Union Carbide Corp., New York, NY; CDL:090356-A)

00115284 Union Carbide Corp. (1977) The Results of Tests on the Amount of Residue Remaining Including a Description of the Analytical Method Used: [Sevin]. (Compilation; unpublished study received Dec 23, 1977 under 1016-EX-39; CDL:096707-A)

00116083 Union Carbide Corp. (1971) The Results of Tests on the Amount of Residue Remaining Including a Description of the Methods Used: [Sevin Carbaryl]. (Compilation; unpublished study received Jul 17, 1972 under 2F1220; CDL:091049-A)

00118342 Union Carbide Corp. (1969) [Study: Carbaryl Residue in Milk, Oysters, and Selected Crops]. (Compilation; unpublished study received May 15, 1970 under 0F0902; CDL:091556-E)

00118346 Knaak, J.; Tallant, M.; Kozbelt, S.; et al. (1968) The metabolism of carbaryl in man, monkey, pig, and sheep. J. Agr. Food Chem.16(3):465-470. 16(3):465-470. (Also in unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-J)

00118347 Knaak, J.; Sullivan, L. (1967) Metabolism of carbaryl in the dog. J. Agr. Food Chem. 15(6):1125. (Also in unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-K)

00118365 Union Carbide Corp. (1969) Metabolism of Carbaryl in Animals: Summary. (Unpublished study received May 15, 1970 under 0F0902; CDL:091556-AD)

00118366 Baron, R. (1968) Radioactive lactose in skim milk following administration of carbonyl-14C-carbaryl to a lactating cow. Journal of the Assoc. Off. Anal. Chem. 51(5):1046-1049. (Also In unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AE)

00118367 Baron, R.; Palmer, N.; Ross, R.; et al. (1968) Distribution of radioactivity in milk resulting from oral administration of 14C-labelled carbaryl. Journal of the Assoc. Off. Anal. Chem. 51 (1):32-34. (Also In unpublished submission received May 15,1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AF)

00118368 Baron, R.; Sphon, J.; Chen, J.; et al. (1969) Confirmatory isolation and identification of a metabolite of carbaryl in urine and milk. Journal of Agricultural and Food Chemistry 17(4):883-887. (Also In unpublished submission received May 15, 1970 under0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AG)

00118370 Dorough, H. (1967) Carbaryl-C14 metabolism in a lactating cow. Agricultural and Food Chemistry 15(2):261-266. (Also In unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AI)

00118371 Dorough, H. (1969) Continuous Feeding of Sevin-naphthyl-C14 to Lactating Cows. Progress rept., Jun 17, 1969. (Unpublished study received May 15, 1970 under 0F0902; prepared by Univ. of Kentucky, Dept. of Entomology, submitted by Union Carbide Corp., New York, NY; CDL:091556-AJ)

00118372 Dorough, H.; Casida, J. (1964) Nature of certain carbamate metabolites of the insecticide Sevin. Agricultural and Food Chemistry 12(4):294-304. (Also In unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AK)

00118373 Dorough, H.; Leeling, N.; Casida, J. (1963) Nonhydrolic pathway in metabolism of N-methylcarbamate insecticides. Science 140(Apr 12):170-171. (Also In unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AL)

00118374 Dorough, H.; Wiggins, O. (1969) Nature of the water-soluble metabolites of carbaryl in bean plants and their fate in rats. Journal of Economic Entomology 62(1):49-53. (Also In unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AM)

00118375 Paulson, G.; Feil, V. (1969) The Fate of a Single Oral Dose of Carbaryl ... in the Chicken. (Unpublished study received May 15, 1970 under 0F0902; prepared by U.S. Agricultural Research Service, Metabolism and Radiation Research Laboratory, Animal Husbandry Research Div., submitted by Union Carbide Corp., New York, NY; CDL:091556-AO)

00118376 Paulson, G.; Zaylskie, R.; Zehr, M.; et al. (1969) Metabolites of Carbaryl ... in Chicken Urine. (Unpublished study received May 15, 1970 under 0F0902; prepared by U.S. Agricultural Research Service, Metabolism and Radiation Research Laboratory, Animal Husbandry Research Div. and Entomology Research Div., submitted by Union Carbide Corp., New York, NY; CDL:091556-AP)

00118377 Sullivan, L. (1969) 5,6-Dihydro-5,6-dihydroxycarbaryl Glucuronide as a Significant Metabolite of Carbaryl in the Rat: Special Report 32-100. (Unpublished study received May 15, 1970 under 0F0902; prepared by Mellon Institute, submitted by Union Carbide Corp., New York, NY; CDL:091556-AQ)

00118378 Whitehurst, W.; Bishop, E.; Critchfield, F.; et al. (1963) The metabolism of Sevin in dairy cows. Agricultural and Food Chemistry 11(2):167-169. (Also In unpublished submission received May 15, 1970 under 0F0902; submitted by Union Carbide Corp., New York, NY; CDL:091556-AR)

00123219 Interregional Research Project No. 4 (1972) The Results of Tests on the Amount of Carbaryl Residues Remaining on or in Pecans, Including a Description of the Analytical Method Used. (Compilation; unpublished study received Oct 18, 1972 under 3E1324; CDL:093553-A)

00124334 Union Carbide Corp. (1977) The Results of Tests on the Amount of Carbaryl Residues Remaining in or on Lentils and Lentil Forage and Hay, Including a Description of the Analytical Method Used. (Compilation; unpublished study received Sep 13, 1978 under1016-68; CDL:097397-A)

00124335 Interregional Research Project No. 4 (1978) The Results of Tests on the Amount of Carbaryl Residues Remaining in or on Pistachios. (Compilation; unpublished study received Nov 21, 1978 under 9E2153; CDL:097652-A)

00124337 Interregional Research Project No. 4 (1965) Results of Tests Concerning the Amount of Carbaryl Residue Remaining in or on Celery, Including a Description of the Analytical Method Used. (Compilation; unpublished study received Mar 11, 1977 under7E1935; CDL:097769-A)

00124343 Herald, C.; Wene, G. (1959) Residue Analyses for Sevin on Cotton Seed Crop and Variety: Reference T-797-142. (Unpublished study received on unknown date under PP0212; submitted by Union Carbide Agricultural Products Co., Inc., Research Triangle Park, NC; CDL:098737-A)

00124345 Union Carbide Agricultural Products Co., Inc. (1959) [Residues: Sevin]. (Compilation; unpublished study received 1959 under PP0222; CD:098753-A)

00124353 Herrett, R.; Bagley, W.; Kramer, J. (1966) Insecticide Sevin: Uptake and Distribution in Corn: 855-31047-8019. (Unpublished study received Oct 5, 1966 under unknown admin. no.; submitted by Union Carbide Corp., Research Triangle Park, NC; CDL: 121177-A)

00124361 Gutenmann, W.; Lisk, D. (1964) Gas Chromatographic Residue Determination of Sevin as Brominated 1-Naphthyl Acetate. (Unpublished study received 1964 under unknown admin. no.; prepared by Cornell Univ., Dept. of Entomology, submitted by ?; CDL:121435-A)

00124367 Union Carbide Corp. (1963) Summary of Sevin and 1-Naphthol Residues in Poultry, Meat and Eggs: Hens Treated by Dust-bath-box Method. (Unpublished study received Mar 13, 1963 under unknown admin. no.; CDL:121450-A)

00124968 Abdel-Wahab, A.; Kuhr, R.; Casida, J. (1966) Fate of C14-carbonyl-labeled aryl methylcarbamate insecticide chemicals in and on bean plants. J. Agr. Food Chem. 14(3):290-297. (Submitter 18274; also In unpublished submission received Jul 15, 1976under 3125-EX-135; submitted by Mobay Chemical Corp., Kansas City, MO; CDL:227756-E)

00125084 Union Carbide Agricultural Products Co., Inc. (19??) [Sevin Residues in Leaves and Other Subjects]. (Compilation; unpublished study received Feb 24, 1958 under PP0169; CDL:092447-A)

00125090 Union Carbide Agricultural Products Co., Inc. (1959) [Study of the Residue of Sevin in Milk, Fruit and Vegetables]. (Compilation; unpublished study received Feb 17, 1959; Jan 22, 1959 under PP0193; CDL:092470-A)

00125099 Union Carbide Agricultural Products Co., Inc. (1959) The Results of Tests on the Amount of Residue Remaining, Including a Description of the Analytical Method Used: [Sevin]. (Compilation; unpublished study received Mar 3, 1959; Jul 9, 1959; Jun 8,1959 under PP0212; CDL:092490-A)

00125107 Union Carbide Agricultural Products Co., Inc. (1960) [Residues: Sevin]. (Compilation; unpublished study received 1960 under PP0243; CDL:092520-A)

00125121 Union Carbide Agricultural Products Co., Inc. (1960) The Results of Tests on the Amount of Residue Remaining on Alfalfa, Grass Forage, Sorghum Forage and Sorghum Grain, Including a Description of the Analytical Methods Used: [Sevin]. (Compilation; unpublished study received 1960 under PP0263; CDL:092540-A)

00125123 Union Carbide Agricultural Products Co., Inc. (1960) [Residues: Sevin]. (Compilation; unpublished study received Nov 28, 1960 under PP0263; CDL:092541-A)

00125138 Union Carbide Agricultural Products Co., Inc. (1961) [Residues: Sevin]. (Compilation; unpublished study received Mar 14, 1960 under PP0302; CDL:092582-A)

00125170 Union Carbide Agricultural Products Co., Inc. (1974) The Results of Tests on the Amount of Residues Remaining, Including a Description of the Methods Used: [Carbaryl]. (Compilation; unpublished study received 1974 under 2F1220; CDL:094079-L)

00125555 Union Carbide Agricultural Products Co., Inc. (1963) [Sevin: Residues in Wheat and Other Crops]. (Compilation; unpublished study received May 3, 1963 under PP0405; CDL:092693-C)

00125571 Union Carbide Agricultural Products Co., Inc. (1963) The Results of Analyses on the Amount of [Carbaryl] Residue Remaining on or in Eggs. (Compilation; unpublished study received Sep 24, 1966 under 7F0538; CDL:092826-B)

00134421 Union Carbide Corp. (1958) Sevin Insecticide Residues in Potatoes. (Compilation; unpublished study received Dec 22, 1958 under unknown admin. no.; CDL:121475-A)

00135678 Union Carbide Agricultural Products Co., Inc. (1961) [Residue: Sevin in Poultry Meat]. (Compilation; unpublished study received 1961 under PP0311; CDL:092591-B)

00135680 Union Carbide Agricultural Products Co., Inc. (1961) [Residue: Sevin in Poultry Products]. (Compilation; unpublished study received Mar 23, 1961 under PP0311; CDL:092592-B)

00136415 Romine, R. (1979) Residue Data Transmittal: [Carbaryl in or on Wheat]. (Unpublished study received Aug 9, 1979 under 264-316; submitted by Union Carbide Agricultural Products Co., Inc., Research Triangle Park, NC; CDL:098950-A)

00139664 Dorough, H. (1971) Carbaryl Residues in Milk and Meat of Dairy Animals. (Unpublished study received Dec 1, 1971 under 2F1220; prepared by Univ. of Kentucky, Dept. of Entomology, submitted by Union Carbide Agricultural Products Co., Inc., Research Triangle Park, NC; CDL:111825-W)

00140447 Union Carbide Agricultural Products Co., Inc. (1962) [Residue: Sevin in Almonds and Filberts]. (Compilation; unpublished study received 1962 under PP0329; CDL:092611-A)

00140449 Union Carbide Agricultural Products Co., Inc. (1961) [Residue: Sevin on Asparagus]. (Compilation; unpublished study received 1961 under PP0333; CDL:092616-B)

00145884 Interregional Research Project No. 4 (1984) The Results of Tests on the Amount of Carbaryl Residues Remaining in or on Loquats Including a Description of the Analytical Method Used. Unpublished study. 30 p.

00147760 Interregional Research Project No. 4. (1984) The Results of Tests on the Amount of Carbaryl Residues Remaining in or on Avocado Including a Description of the Analytical Method Used. Unpublished compilation. 27 p.

00154626 Union Carbide Agricultural Products Co., Inc. (1984) Results of Tests on the Amount of Residue Remaining Including a Description of the Analytical Method Used: Carbaryl on or in Pineapples . Unpublished compilation. 26 p.

00156736 Union Carbide Agricultural Products Co. (1985) Sevin (Carbaryl) Residues in Pineapple Products. Unpublished compilation. 29 p.

00159324 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Potato Processing Study: Project No. 801R11: File No. 34477. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc.20 p.

00159325 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Alfalfa Processing Study: Project No. 801R11: File No. 34398. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 11 p.

00159326 Davis, C.; Thomas, S. (1986) Sevin Brand Carbaryl Insecticide: Tomato Processing Study: Project No. 801R11: File No. 34397. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 13 p.

00159327 Davis, C.; Thomas, S. (1986) Sevin Brand Carbaryl Insecticide: Apple Processing Study: Project No. 801R11: File No. 34443. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 13 p.

00159328 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Prune Processing Study: Project No. 801R11: File No. 34438. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 8 p.

00159329 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Sweet Sorghum Processing Study: Project No. 801R11: File No. 34413. Unpublished study prepared by Union Carbide Agricultural Products Co. Inc. 13 p.

00163006 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Magnitude of Carbaryl Residues on Rangeland and Pasture Grasses: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Hazleton Laboratories, Inc. 78 p.

00163007 Thomas, S. (1986) Sevin Brand Carbaryl Insecticide: Magnitude of Carbaryl Residues in Sugar Beet Roots: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Hazleton Laboratories America, Inc. 28 p.

00163008 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Citrus Processing Study: Residue Data in Grapefruits, Oranges, and Lemons: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Univ. of Florida, Citrus Research and Education Center. 46 p.

00163009 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Field Corn Processing Study: Residue Data: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Texas A&M University, Food Protein Center and US Dept. of Agriculture, Northern Regional Research Center. 22 p.

00163010 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Grape Processing Study: Residue Data: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Agricultural Chemicals Development Services, Inc. 13 p.

00163011 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Magnitude of Carbaryl Residues in Raisins and Raisin Waste: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 15 p.

00163012 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Peanut Processing Study: Residue Data: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Texas A&M Univ., Food Protein Center. 18 p.

00163013 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Rice Processing prepared bu Union Carbide Agricultural Products Co., Inc. in cooperation with Univ. of Arkansas, Dept. of Entomology. 15 p.

00163014 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Magnitude of Carbaryl Residues in Snap Bean Cannery Waste: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 19 p.

00163015 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Grain Sorghum Processing Study: Project No. 801R11: File No. 34847. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 12 p.

00163016 Davis, C.; Thomas, S. (1986) Sevin Brand Carbaryl Insecticide: Soybean Processing Study: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Texas A&M Univ., Food Protein Center. 17 p.

00163017 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Sugar Beet Processing Study: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 16 p.

00163018 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Magnitude of Carbaryl Residues in Sweet Corn Cannery Waste: Project No. 801R11. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 19 p.

05008444 Baron, R.L. (1978) Terminal residues of carbamate insecticides. Pure and Applied Chemistry 50(5):505-509.

40255702 Davis, C. (1986) Sevin Brand Carbaryl Insecticide: Magnitude of Carbaryl Residues in Sweet Corn Cannery Waste: Project No.: 801R11: File No.: 34830. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 21 p.

40376001 Davis, C.; Thomas, S. (1985) Sevin Brand Carbaryl Insecticide: Method of Analysis for Carbaryl in Alfalfa (Modified to Include Sugar Beets): Laboratory Project ID: 801R11; File No: 33769. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. 17 p.

40376002 Davis, C. (1987) Data in Support of Sugar Beet Root: Residue Data Submitted as Part of Pesticide Petition # 7F3490. Unpublished compilation prepared by Aventis Ag Co. 42 p.

40408601 Davis, C.; Thomas, S. (1987) Carbaryl Insecticide: Magnitude of the Residue Crop Field Trials: Barley: Project No. 801R11 and File No. 40092. Unpublished study prepared by Union Carbide Agricultural Products Co., Inc. in cooperation with Hazleton Laboratories America, Inc. 136 p.

40512501 Sorensen, K.; Sheets, T.; Markle, G. (1987) Carbaryl--Magnitude of Residues on Potato (Post Harvest): Project No. 402. Unpublished study prepared by North Carolina State Univ. 31 p.

40881302 Butler, L.; McDonough, L. (1970) Specific glc method for determining residues of carbaryl by electron capture detection after derivative formation. Journal of the AOAC 53(3):494-499.

40881307 Pablo, F.; Bello, F. (19??) Carbaryl and monocrotophos residues in cottonseeds, oil and cake. Phillipine Entomologist (?):301-309.

40881308 Nir, I.; Weisenberg, E.; Hadani, A.; et al. (1966) Studies of the toxicity, excretion and residues of sevin in poultry p. 719-728.

40881309 McCay, C.; Arthur, B. (1962) Sevin residues in poultry products. Journal of Economic Entomology 55(6):936-938.

40881312 Johnson, D. (1963) Determination of Sevin insecticides residues in fruits and vegetables. Journal of the AOAC 46(2):233-237.

40881313 Johnson, D. (1964) Determination of sevin insecticide residues in fruits and vegetables. Journal of the AOAC 47(2):282-287.

40881314 Miskus, R.; Gordon, H.; George, D. (1959) Colorimetric determination of 1-naphthyl n-methylcarbamte in agricultural crops. Agricultural and Food Chemistry 7(?):612-614.

41594301 Lee, R. (1990) Carbaryl Insecticide: Wheat: Residues -Examination of Residue Levels in/on Forage, Straw and Grain at Selected PreHarvest Intervals: Lab Project Number: S86-054-02: 40533. Unpublished study prepared by Aventis Ag Co. 79 p.

43249101 Harsy, S. (1994) Metabolic Fate and Distribution of (carbon 14)-Carbaryl in Lettuce: Final Report: Lab Project Number: HWI 6224-188: EC-92-231. Unpublished study prepared by Hazleton Wisconsin, Inc. 125 p.

43249102 Harsy, S. (1994) Metabolic Fate and Distribution of (carbon 14)-Carbaryl in Radishes: Final Report: Lab Project Number: HWI 6224-186: EC-92-232. Unpublished study prepared by Hazleton Wisconsin, Inc. 164 p.

43249103 Harsy, S. (1994) Metabolic Fate and Distribution of (carbon 14)-Carbaryl in Soybeans: Final Report: Lab Project Number: HWI 6224-190: EC-92-233. Unpublished study prepared by Hazleton Wisconsin, Inc. 178 p.

43324601 Struble, C. (1994) Nature of the Residue of (carbon 14)--Carbaryl in Laying Hens: Final Report: Lab Project Number: HWI 6224-183: EC-92-223. Unpublished study prepared by Hazleton Wisconsin, Inc. 157 p.

43651701 Harsy, S. (1995) (Carbon-14) Carbaryl Accumulation in Confined Rotational Crops (Screenhouse Study): Lab Project Number: HWI 6224-192: EC-94-284. Unpublished study prepared by Hazleton Wisconsin, Inc. 180 p.

43654201 Chancey, E. (1995) Sevin XLR Plus: Carbaryl Residues in/on Asparagus Raw Agricultural Commodities: Final Study Report: Lab Project Number: 44695: US94S20R: 94-0143. Unpublished study prepared by Aventis Ag Co. 239 p.

43672701 Thiem, D. (1995) Method Validation for Aventis Ag Company Method No. CACR-0194 Revised March 27, 1995: Carbaryl General Method for the Determination of Residue in Crop Samples by High Performance Liquid Chromatography: Final Report: Lab Project Number: 44754: 1247. Unpublished study prepared by Colorado Analytical Research & Development Corp. 353 p.

43672702 Humble, G.; Herzig, R. (1995) Independent Laboratory Confirmation of the Tolerance Enforcement Method by EPA Notice 88-5 for Carbaryl: General Method for the Determination of Residues in Crop Samples by High Performance Liquid Chromatography: Final Report: Lab Project Number: RES9544:44778: 8765. Unpublished study prepared by Agvise Labs, Inc.120 p.

43677401 Tew, E.; Koktavy, K. (1995) Sevin XLR PLUS: Magnitude of Carbaryl Residues in Leafy Vegetables (Celery, Head Lettuce, Leaf Lettuce, and Spinach): Lab Project Number: US94S04R: 44749. Unpublished study prepared by Research Designed for Agriculture; Ag Consulting Inc.; Agsearch Co. 608 p.

43686701 Ely, C. (1995) Carbaryl: Magnitude of Carbaryl Residues in Bell Peppers Following Treatment with SEVIN XLR PLUS: Final Report: Lab Project Number: 94-0059: 44758: US94S14R. Unpublished study prepared by EN-CAS Analytical Labs. 262 p.

43686702 Lee, R. (1995) SEVIN XLR PLUS: Carbaryl Tomato Processing (Magnitude of Residues): Final Report: Lab Project Number: 44759: US94S01R: 94-0001. Unpublished study prepared by Aventis Ag Co. 228 p.

43694101 Mede, K. (1995) CARBARYL: Magnitude of Residues in/on Blueberries Resulting from Ground Application of SEVIN XLR PLUS (1994): Final Report: Lab Project Number: 94-0177: 94-0178: 94-0179. Unpublished study prepared by Enviro-Bio-Tech and Aventis. 216 p.

43694102 Robinson, P. (1995) Carbaryl: Magnitude of Carbaryl Residue in/on Soybeans: Final Report: Lab Project Number: US94S41R: 44740: 94-0248. Unpublished study prepared by Agri Business Group, Inc. 459 p.

43694103 Robinson, P. (1995) Carbaryl: Magnitude of Carbaryl Residue in/on Dried Peas: Final Report: Lab Project Number: US94S39R: 44737: 94-0232. Unpublished study prepared by Agri Business Group, Inc. 291 p.

43694104 Robinson, P. (1995) SEVIN XLR PLUS: Carbaryl Citrus Processing (Orange): Final Report: Lab Project Number: 94-0095: US94S10R: 44734. Unpublished study prepared by Agri Business Group, Inc. 248 p.

43694105 Singer, G. (1995) Carbaryl: Magnitude of Residues in/on Clover Forage and Clover Hay Resulting from a Ground Application of SEVIN XLR PLUS: Final Report: Lab Project Number: 94-0321: 94-0322: 94-0323. Unpublished study prepared by American Agricultural Services, Inc. 488 p.

43697601 Robinson, P. (1995) Sevin XLR PLUS: Carbaryl: Grape Processing (Raisins): Final Report: Lab Project Number: US94S13R: 44733: 94-0098. Unpublished study prepared by Agri Business Group, Inc. 468 p.

43697602 Robinson, P. (1995) Sevin XLR PLUS: Carbaryl: Grape Processing (Juice): Final Report: Lab Project Number: US94S12R: 44732: 94-0097. Unpublished study prepared by Agri Business Group, Inc. 312 p.

43697603 Robinson, P. (1995) Carbaryl: Magnitude of Carbaryl Residue in Processed Potato Fractions Following Field Treatment with Sevin XLR Plus: Final Report: Lab Project Number: US94S21R: 44742: 94-149. Unpublished study prepared by Agri Business Group, Inc. 319 p.

43697604 Mede, K. (1995) Carbaryl: Magnitude of Residue in/on Cranberries Resulting from Ground Applications of Sevin XLR Plus (1994): Final Report: Lab Project Number: US94S28R: 44780: 94-0181. Unpublished study prepared by Aventis Ag Co. and Enviro-Bio-Tech, Ltd. 216 p.

43698201 Lee, R. (1995) Carbaryl: Magnitude of Residues in/on Caneberries Resulting from Ground Applications of Sevin XLR Plus (1994): Final Report: Lab Project Number: US94S18R: 44760: 94-0173. Unpublished study prepared by Aventis Ag Co. 220 p.

43698202 Mede, K. (1995) Carbaryl: Magnitude of Residues in/on Strawberries Resulting from Ground Applications of Sevin XLR Plus (1994): Final Report: Lab Project Number: US94S30R: 44765: 94-0195. Unpublished study prepared by Aventis Ag Co. and Enviro-Bio-Test, Ltd. 216 p.

43698203 Robinson, P. (1995) Determination of the Magnitude of Residues in Olive Oil Processed from Olives Treated with Sevin XLR Plus Brand of Carbaryl Insecticide: Final Report: Lab Project Number: US94S02R: 44731: 94-002. Unpublished study prepared by Agri Business Group, Inc. 263 p.

43702001 Macy, L.; Lee, R. (1995) Carbaryl: Determination of the Magnitude of Residues on Olives Treated with Foliar Applications of SEVIN XLR Plus Brand of Carbaryl Insecticide: Final Report: Lab Project Number: US94S09R: 44791: 94-0091. Unpublished study prepared by Colorado Analytical Research & Development Corp. and Aventis Ag Co. 288 p.

43702002 Kowite, W. (1995) Carbaryl: Magnitude of Residues in Sweet Potato RAC Resulting from Applications of SEVIN XLR Plus Insecticide (1994): Final Report: Lab Project Number: US94S16R: 44794: 94-0117. Unpublished study prepared by Colorado Analytical Research & Development Corp. and Aventis Ag Co. 367 p.

43702003 Cappy, J. (1995) Carbaryl: Magnitude of Carbaryl Residues in/on Apples and Processed Fractions of Apples: Final Report: Lab Project Number: US94S11R: 44773: 94-0096. Unpublished study prepared by Enviro-Bio-Tech, Ltd. and Aventis Ag Co. 263 p.

43703101 Kowite, W. (1995) Carbaryl: Magnitude of Residues in Peanuts RAC Resulting From Application of Sevin XLR PLUS Insecticide (1994): Final Report: Lab Project Number: US94S22R: 44795: 94-0150. Unpublished study prepared by Enviro-Bio-Tech, Ltd. 332 p.

43703102 Robinson, P. (1995) Carbaryl: Magnitude of Carbaryl Residue In/On Fresh Peas: Final Report: Lab Project Number: US94S40R: 44738: 94-0240. Unpublished study prepared by Aventis Ag Co. 332 p.

43703103 Macy, L. (1995) Carbaryl: Determination of the Magnitude of Residues on Pistachios Treated with Foliar Applications of SEVIN XLR PLUS of Carbaryl Insecticide: Final Report: Lab Project Number: US94S23R: 44792: 94-0158. Unpublished study prepared by Enviro-Bio-Tech, Ltd. 246 p.

43716601 Singer, G. (1995) Carbaryl: Magnitude of Residues in/on Pasture Forage and Pasture Hay Resulting From Ground Applications of the SEVIN XLR PLUS: Final Report: Lab Project Number: 94S43R: 44654: 94-0329. Unpublished study prepared by American Agricultural Services, Inc. 670 p.

43721001 Macy, L. (1995) Carbaryl: Magnitude of Residues in/on Broccoli Resulting from Ground Applications of Sevin XLR Plus (1993): Final Study Report: Lab Project Number: US94S05R: 44799: 94-0051. Unpublished study prepared by Aventis Ag Co. and Colorado Analytical & Development Corp. 301 p.

43786801 Macy, L. (1995) Carbaryl: Determination of the Magnitude of Residues on Almonds Treated with Foliar Applications of SEVIN XLR Brand of Carbaryl Insecticide: Final Report: Lab Project Number: US94S19R: 94-0199: 94-0200. Unpublished study prepared by Aventis Ag Co. and Enviro-Bio-Tech, Ltd. 279 p.

43786802 Lee, R. (1995) SEVIN XLR PLUS: Magnitude of Carbaryl Residues in/on Cucurbit Vegetable Raw Agricultural Commodities: Final Report: Lab Project Number: 44870: US94S15R: 94-0060. Unpublished study prepared by EN-CAS Analytical Labs. 552 p.

43786803 Robinson, P. (1995) Determination of the Magnitude of Residues in Sunflower Seeds and Forage Treated with Foliar Applications of SEVIN XLR PLUS Brand of Carbaryl Insecticide: Final Report: Lab Project Number: 44741: US94S44R: 94-0220. Unpublished study prepared by Agri Business Group. 311 p.

43786804 Robinson, P.; Cappy, J. (1995) Carbaryl: Magnitude of Carbaryl Residue in/on Dried Beans: Final Report: Lab Project Number: ML 95-0514-RHP: 44736: US94S38R. Unpublished study prepared by Agri Business Group. 341 p.

43786805 Pittman, J. (1995) Radiovalidation of the Method No. CARC-0194 Revised March 27, 1995: "Carbaryl Method for the Determination of Residue in Crop Samples by High Performance Liquid Chromatography": Final Report: Lab Project Number: EC-95-308: 6295: 44789. Unpublished study prepared by Aventis Ag Co. 107 p.

43786806 Mede, K. (1995) Carbaryl: Magnitude of Residues in/on Cabbage Resulting from Application of SEVIN XLR PLUS (1993): Final Report: Lab Project Number: US94S06R: 94-0059: 94-0060. Unpublished study prepared by Colorado Analytical Research & Development Corp. 326 p.

43793201 Tew, E. (1995) Carbaryl: Magnitude of Residues in/on Grapes Resulting from Ground Applications of Sevin XLR Plus (1994): Final Study Report: Lab Project Number: 44856: US94S29R: ML94-0509-RHP. Unpublished study prepared by Aventis Ag Co. 349 p.

43793202 Ely, C. (1995) Carbaryl: Magnitude of Residues in Stone Fruit (Cherry, Peach, and Plum) RAC Resulting from Applications of Sevin XLR Plus (1994): Final Study Report: Lab Project Number: 44822: US94S17R: 94-0123. Unpublished study prepared by Aventis Ag Co. and McKenzie Labs, Inc. 495 p.

43794901 Robinson, P. (1995) Carbaryl: Magnitude of Carbaryl Residues in/on Sorghum: Final Report: Lab Project Number: US94S42R: 44739: 94/0070. Unpublished study prepared by Agri Business Group. 592 p.

43794902 Cappy, J. (1995) Carbaryl: Magnitude of Carbaryl Residues in/on Soybean and Processed Fractions of Soybean: Final Report: Lab Project Number: US94S33R: 44880: 1258/US94S33R. Unpublished study prepared by Colorado Analytical & Development Corp. 296 p.

43794903 Mede, K. (1995) Carbaryl: Magnitude of Residues in/on Mustard Green Resulting from Ground Applications of Sevin XLR Plus (1993): Final Report: Lab Project Number: US94S07R: 44872: 1230/US94S07R. Unpublished study prepared by Colorado Analytical & Development Corp. 291 p.

43802101 Hovis, A. (1995) Sevin XLR Plus: Magnitude of Carbaryl Residues in Citrus (Orange, Grapefruit, Lemon): Final Report: Lab Project Number: 44860: US94S08R: 94-0075. Unpublished study prepared by Aventis Ag Co. and Enviro-Bio-Tech, Ltd. 407 p.

43802102 Macy, L. (1995) Carbaryl: Determination of the Magnitude of Residues on Pecans Treated with Foliar Applications of Sevin XLR Plus Brand of Carbaryl Insecticide: Final Report: Lab Project Number: 44871: US94S32R: 94-0209. Unpublished study prepared by Aventis Ag Co. and EN-CAS Analytical Labs. 303 p.

43802103 Mede, K. (1995) Carbaryl: Magnitude of the Residues in/on Rice Resulting from Foliar Applications of Sevin XLR Plus (1994): Final Report: Lab Project Number: 44853: US94S24R: 94-0163. Unpublished study prepared by Aventis Ag Co. and EN-CAS Analytical Labs. 498 p.

43813601 Kowite, W. (1995) Carbaryl: Magnitude of Residues in Root and Tuber Crops (Garden Beets, Carrots, and Turnips) RAC Resulting from Application of Sevin XLR Plus Insecticide (1994): Final Report: Lab Project Number: US94S03R: 44883: 94-0003 CA. Unpublished study prepared by Colorado Analytical Research & Development Corp. and Aventis Ag Co. 854 p.

43813602 Cappy, J. (1995) Carbaryl: Magnitude of Carbaryl Residues in/on Wheat and Processed Fractions of Wheat: Final Report: Lab Project Number: US94S36R: 44884: 94-0218. Unpublished study prepared by Enviro-Bio-Tech, Ltd. and Aventis Ag Co. 267

43813603 Macy, L. (1995) Carbaryl: Magnitude of Residues in Processed Rice Fractions Resulting from Applications of Sevin XLR Plus (1994): Final Report: Lab Project Number: US94S26R: 44889: RP-04-95. Unpublished study prepared by Enviro-Bio-Tech, Ltd. and Aventis Ag Co. 187 p.

43813604 Cappy, J. (1995) Carbaryl: Magnitude of Carbaryl Residues in/on Grain Sorghum and Processed Fractions of Grain Sorghum: Final Report: Lab Project Number: US94S35R: 44892: 94-0217. Unpublished study prepared by Aventis Ag Co. and Colorado Analytical Research & Development Corp. 270 p.

43818901 Macy, L. (1995) Carbaryl: Determination of the Magnitude of Residues on Walnuts Treated with Foliar Applications of SEVIN XLR Plus Brand of Carbaryl Insecticide: Final Report: Lab Project Number: US94A31R: 94-0204: 94-0205. Unpublished study prepared by EN-CAS Analytical Labs. 295 p.

43845205 Robinson, P. (1995) Determination of the Magnitude of Residues in Sunflower Seed Processed Fractions Treated with Foliar Applications of SEVIN XLR Plus Brand Carbaryl Insecticide: Final Report: Lab Project Number: 44735: US94S37R: 94-0219. Unpublished study prepared by Agri Business Group. 484 p.

43850901 Lee, R. (1995) Sevin XLR Plus: Magnitude of Carbaryl Residue in/on Cottonseed and Processed Fractions of Cottonseed: Final Report: Lab Project Number: US94S25R: 44875: 94-0162. Unpublished study prepared by Aventis Ag Co. 390 p.

43850902 Shults, J. (1995) Storage Stability of Carbaryl on Frozen Raw Agricultural Commodity Substrates and Selected Processing Fractions: Final Report: Lab Project Number: US94S47R: U:\RHONE\94S47RFR.DOC. Unpublished study prepared by McKenzie Labs, Inc. 276 p.

43915201 Cappy, J. (1995) Carbaryl: Magnitude of Carbaryl Residue in/on Field Corn and Processed Fractions of Field Corn: Final Report: Lab Project Number: US94S34R: 44944: 1272. Unpublished study prepared by Rhone-Poulenc Ag Co. 309 p.

43975601 Ely, C. (1996) SEVIN XLR PLUS: Magnitude of Carbaryl Residues in/on Wheat Grain: Final Report: Lab Project Number: US95S10R: 45031: 95-0126. Unpublished study prepared by Aventis Ag Co. 315 p.

43982801 Lee, R. (1996) Determination of the Magnitude of Residues on Flax Seed and Straw Treated with Foliar Applications of SEVIN XLR Plus Brand of Carbaryl Insecticide: Final Study Report: Lab Project Number: US95S12R: 45045: 1278. Unpublished study prepared by Agvise Laboratories; Agri Business Group; and Colorado Analytical Research and Development. 240 p.

43984701 Hovis, A. (1996) Sevin XLR Plus: Magnitude of Carbaryl Residues in/on Succulent Beans: Final Report: Lab Project Number: US95S14R: 45044: 95-0258. Unpublished study prepared by McKenzie Labs, Inc.; Agri Business Group, Inc.; and Aventis Ag Co. 273 p.

43996101 Macy, L. (1996) Magnitude of Residues in/on Tomatoes Resulting from Foliar Applications of Sevin XLR Plus (1995): Final Report: Lab Project Number: US95S05R: 95-0149: 95-0150. Unpublished study prepared by McKenzie Laboratories. 323 p.

44019701 Macy, L. (1995) Carbaryl: Magnitude of Residues in/on Broccoli Resulting from Ground Applications of Sevin XLR Plus (1993): Amended Final Report: Lab Project Number: US94SO5R: 44799: 1231/US94SO5R. Unpublished study prepared by Colorado Analytical Research and Development Corporation: Aventis Ag Co.: and Agvise Lab. 303 p.

44046101 Chancey, E. (1996) Carbaryl Residues in Processed Peanut Fractions: Final Study Report: Lab Project Number: US95S03R: 45070: 95-0161. Unpublished study prepared by Texas A&M University Food Protein R&D Center and Colorado Analytical R&D Corp. 234 p.

44058001 Chancey, E. (1996) Sevin XLR Plus: Magnitude of Carbaryl Residues in/on Field Corn Raw Agricultural Commodities: Final Report: Lab Project Number: US95S01R: 45068: 95-0117. Unpublished study prepared by Colorado Analytical Research and Development Corp. and Aventis Ag Co. 356 p.

44058101 Kowite, W. (1996) Carbaryl: Magnitude of Residues in or on Sweet Corn RAC Resulting from Application of Sevin XLR Plus Insecticide (1995): Final Report: Lab Project Number: US95S13R: 45099: 95-0195. Unpublished study prepared by Aventis Ag Co. 303 p. Relates to L0000109.

44065901 Norris, F. (1996) Carbaryl: Magnitude of Residues in/on Rangeland Forage Resulting from an Aerial Application of Sevin 4-Oil ULV: Lab Project Number: US95S02R: 45095: 95-0037. Unpublished study prepared by Diamond Ag Research; Midwest Research, Inc.; and Agvise Labs., Inc. 270 p.

44068401 Norris, F. (1996) Carbaryl: Freezer Storage Stability of Carbaryl in/on Selected Agricultural Commodities: Lab Project Number: US95S15R: 45112: ML95-0570-RHP. Unpublished study prepared

by Colorado Analytical Research & Development Corp.; Enviro-Bio-Tech, Ltd.; Morse Laboratories, Inc. 433 p.

44072901 Mede, K. (1996) Carbaryl: Magnitude of Residues in/on Pome Fruit Resulting from Foliar Applications of SEVIN XLR Plus (1995): Final Report: Lab Project Number: US95S06R: 45101: 95-0141. Unpublished study prepared by McKenzie Labs. 293 p. (Relates to L0000110).

44114301 O'Neal, S.; Bentley, W. (1996) Identification of the Pyrolysis Products of (carbon 14)Carbaryl in Cigarette Smoke: (Final Report): Lab Project Number: 984: 1912: EC-95-326. Unpublished study prepared by PTRL East, Inc. 128 p.

44123101 Dorschner, K. (1996) Carbaryl: Magnitude of the Residue on Okra Fruit (Pods): (Final Report): Lab Project Number: 05772: PR 05772: 5772.95-FL25. Unpublished study prepared by North Carolina State University; University of Florida; and USDA/ARS SARL. 436 p.

44145201 Dorschner, K. (1996) Carbaryl: Magnitude of the Residue on Prickly Pear Cactus Fruit and Pads: Lab Project Number: 5146: 05146: PR 05146. Unpublished study prepared by Herbicide Science Agriculture Foundation and Food and Environmental Toxicology Lab., University of Florida. 261 p.

44155401 Nandihalli, U. (1996) Independent Laboratory Validation of a Method for the Determination of Residues of Carbaryl in Crop Samples: Final Report: Lab Project Number: CHW 6224-233: 45151: 11642. Unpublished study prepared by Corning Hazleton, Inc. 71 p.

44211801 Ely, C. (1997) Sevin XLR Plus: Magnitude of Carbaryl Residues in/on Oranges Grown in EPA Region 10: Final Report: Lab Project Number: US95S11R: 45202: 1282. Unpublished study prepared by Aventis Ag Co. 299 p. (Relates to L0000142).

44250301 Hunt, T. (1997) Sample Storage Intervals and Conditions Data to Support MRIDs 42883102, 42883103, 42883104: (Magnitude of Residues of Carbaryl): Final Report: Lab Project Number: 45268. Unpublished study prepared by Aventis Ag Co. 17 p.

44250901 Lee, R. (1997) Carbaryl: Magnitude of Residues in Milk and Tissues of Lactating Dairy Cows: Final Report: Lab Project Number: 96S06298: 45266: 96139B. Unpublished study prepared by Southwest Bio-Labs, Inc.; Colorado Analytical Research and Development; and Aventis Ag Co. 1270 p. (Relates toL0000170). {OPPTS 860.1480}.

44284701 Macy, L. (1997) Sevin 80WSP: Magnitude of Carbaryl Residues in/on Stone Fruit (Cherry, Peach, and Plum) RAC in California: Final Report: Lab Project Number: 96S10562: 45306: 10562-01. Unpublished study prepared by Aventis Ag Co. 372 p.

44286901 Ibrahim, A. (1997) Carbaryl--Validation of Method of Analysis for Free and Conjugated Carbaryl, 5,6-Dihydro-5,6-dihydroxy Carbaryl and 5-Methoxy-6-hydroxy Carbaryl in Egg, Milk, Poultry, and Animal Tissues: Final Report: Lab Project Number: EC-96-349: 45319: 45186. Unpublished study prepared by Aventis Ag Co. 300 p. {OPPTS 860.1340}

44286902 Curti, J.; Keller, G. (1997) Independent Laboratory Validation of a Method for the Determination of Free and Conjugated Carbaryl, 5,6-Dihydro-5,6-dihydroxy Carbaryl, and 5-Methoxy-6-hydroxy Carbaryl in Egg, Milk, and Beef Liver: Final Report, : Lab Project Number: 6224-237: EC-97-365. Unpublished study prepared by Covance Labs, Inc. 155 p.{OPPTS 860.1340}

44286903 Ibrahim, A. (1997) Method of Analysis for the Determination of Free and Conjugated Carbaryl, 5,6-Dihydro-5,6-dihydroxy Carbaryl, and 5-Methoxy-6-hydroxy Carbaryl and Egg, Milk, Poultry and Animal Tissues: Revised: Lab Project Number: 45321. Unpublished study prepared by Aventis Ag Co. 40 p.

44303101 Lee, R. (1997) Carbaryl and Its Metabolites: Magnitude of Residues in Milk and Tissues of Lactating Dairy Cows: Storage Stability (Interim Report): Lab Project Number: 96S12035: 1292: 45132. Unpublished study prepared by Colorado Analytical Research and Development Corp. 448 p.

44321301 Mede, K. (1997) Carbaryl: Magnitude of Residues in/on Olives Resulting from Foliar Applications of Sevin 80WSP (1996): Final Report: Lab Project Number: 96S10561: 45324: 10561-01. Unpublished study prepared by Aventis Ag Co. 179 p.

44381901 Lee, R. (1997) Carbaryl and Its Metabolites: Magnitude of Residues in Milk and Tissues of Lactating Dairy Cows Storage Stability: Final Study Report: Lab Project Number: 45402: 96S12035: Aventis 1292. Unpublished study prepared by Colorado Analytical Research and Development, Inc. 466 p. {OPPTS 860.1380}

44412501 Ely, C. (1997) Sevin XLR Plus: Magnitude of Carbaryl Residues in/on Wheat Grain: Amended Report: Lab Project Number: US95S10R: 45031: 95-0126. Unpublished study prepared by Colorado Analytical Research & Development Corp. and Agvise Labs. 359 p. {OPPTS 860.1500}